MEDICAL REPOSITORY.

VOL. VI.—No. IV.

ARTICLE I.

On the EPIDEMIC DISTEMPERS *of the Year* 1802. *By* NATHANIEL POTTER, *M. D. of Baltimore. Communicated to Dr.* MITCHILL, *in a Letter dated January* 28, 1803.

No. I.—MEASLES.

THE year 1802 constitutes a very interesting crisis in the history of American epidemics, more especially to those who view the Measles, Scarlatina, and Yellow Fever, as originating from one great general cause, and, consequently, as links of the same pestilential chain.

The winter 1801-2 was the dryest and warmest that can be remembered by the oldest inhabitants of our city. The mercury stood above the freezing point not only during the day, but through the night, much the greater part of the winter. The gutters, docks, and other repositories of *filth*, emitted an effluvium little less offensive than that which is exhaled during the summer and autumnal months. Whether the result of putrefaction contributed in any degree to modify the characters of our winter epidemics, I shall not pretend to decide; but state the most prominent symptoms and greatest variations, they occurred to my own observation, and leave the learned to deduce such conclusions as they may think reasonable.

Agreeably to the report of some of our practitioners, the measles commenced their reign about the first of January; but the symptoms were not completely developed in any case that occurred to my observation until the 15th of that month. During the months of November and December, I had remarked the unusual frequency of an indistinct efflorescence, which was occasionally associated with every assemblage of symptoms which might have been occasioned by the vicissitudes of the weather. It appeared to me to be the evanescent.

shade of the scarlatina retiring before the majesty of a more terrible enemy. It is true that the scarlatina had not been epidemic, but decided cases had occurred sporadically, not only in November and December, but during all the last year. This efflorescence was associated with inflammations of the parotid glands, and of the tonsils, with inflammation of the lungs and pleura, and with symptoms of catarrh, intermittent fever, and dysentery, and with a variety of anomalies that have no name in nosology, until it was suffocated with them all by the arbitrary interposition of the epidemic measles. No sooner had this disease discovered its proper features than every other fled before it; and what the poet says of fame may be justly applied to this as well as to other great epidemics: "*Mobilitate viget viresque acquirit eundo.*" So truly despotic were the causes producing measles, that even many of those who had suffered their influence in former epidemics were not entirely exempted. This miniature picture of the genuine disease appeared in several forms; viz. in catarrhal symptoms, in slight inflammations of the throat, in a sense of heaviness over the forehead, in a frequent watery discharge from the eyes, and, in a few cases, it was manifested by an eruption and a morbillous cough. These affections gave rise to an opinion that the system could be susceptible of measles more than once, and I shall say hereafter that this opinion was revived in spring, when the scarlatina arrogated the same dominion over the measles that the measles had done over the minor diseases of the winter. This second sensibility to the causes of measles seemed to be heightened by some inviting predisposition; but, above all, by previous diseases of the lungs. Adults were much more susceptible than children to this second impression; whence it would seem that the latter laboured under fewer predispositions, or that the former had partially lost the former morbillous impression. I did not see a person under ten years old affected with the slightest symptom, who had the disease when it was epidemic here six years ago. I saw no vestige of it in subjects above forty years old. Children were less violently affected by genuine measles than adults, but there were few grown persons who had not previously experienced them. This epidemic did not appear to me to merit the appellation of contagious in the same degree as small-pox, nor, indeed, in a very considerable degree. The causes seemed to me rather derived from the atmosphere than from a sick person; for many persons resided in families where the disease prevailed, and even slept with measly children with impunity.

Should it be contended that measles are, strictly speaking, communicable from a sick to a well person, and should the opinion be well founded, is it not probable that some morbid or other strong impression had previously rendered such persons unsusceptible of impression from morbillous effluvia, just as the vaccine disqualifies the system for the reception of impression from variolous matter? There are, no doubt, many agents yet to be discovered, that may act as eternal preventives of the most deleterious poisons. Will he not be entitled to immortality who shall, by such a discovery, obviate the effects of the saliva of a mad dog, or of the plague-engendering poison?

The symptoms of measles are so well known that I shall only notice such as do not constantly occur, or such as require attention in a therapeutic point of view. As in other epidemics, so in this, there were many cases so mild as not to require the interference of a physician: indeed, it was so light in some children that none but the physician discovered it. The head was more violently affected with pain and tension over the forehead than is common in measles, although the swelling of the face was less considerable. The affection of the breast was the most important consideration, as the greatest danger was to be apprehended from effusions in the lungs: indeed, the organs of respiration, and parts adjacent, were affected in all the intermediate degrees between a slight cough and a most inflammatory fever. In some children the trachea and bronchial vessels were so highly excited as to occasion symptoms of croup. The affection of the stomach did not amount to that degree of puking which is so often mentioned by writers on measles; but a deadly sickness and a corroding sensation were constantly complained of. The affection of the stomach was less violent in adults than in children. The diarrhœa, so generally noticed in books, was seldom a symptom of this disease; never, that I know of, unless in consequence of neglected evacuations. The danger of the disease was in no wise in the ratio of the violence of the attack; for the cases that often proved most formidable manifested no turbulent symptoms until about the seventh day, when a sudden pulmonic affection often prostrated the system in a few hours. The ear-ach was often a symptom in children, as well during the inflammatory state as during convalescence. The eyes were sometimes highly inflamed, although ophthalmia was oftener a consequence than a symptom of the disease.

The cure of the measles this year may be almost reduced to two simple remedies, *blood-letting* and *purging;* for when these were used in time, and carried to a sufficient extent, little or nothing remained to be done. These remedies were no less efficacious in removing the immediate symptoms than in preventing the consequences of the disease. This will be sufficiently apparent when we enumerate the deplorable train of consequences that followed their neglect. Such was the inflammatory grade of this disease, that a repetition of the use of the lancet was frequently required to the fourth or fifth time. As long as any symptom indicated the smallest relict of inflammation, the lancet was the most safe and efficacious remedy. The pulse required much attention, in some cases, to perceive the necessity of this remedy. Excessive inflammation or infarctions of the lungs, bronchia, or trachea, often obstructed the process of respiration in such a degree as to influence the pulse very materially. The skin was often cold, the cough laborious and unproductive, with all the symptoms of great indirect debility, with a pulse scarcely to be felt, and yet no remedy but venæsection could be depended on for relief; for the pulse rose after it, and free, distinct action, developed itself in all cases where the prostration had not continued a considerable time. This affection of the breast constituted the principal danger in this disease, but never produced death where the lancet was used early, and carried to a proper extent. Where the system had remained long in this semi-suffocated state, the lips and nails appeared blue, and a dark grumous blood was often expectorated. These were commonly the gloomy presages of approaching dissolution, unless the heart and arteries re-acted after bleeding, which was generally the case when it was practised before the ninth day, and sometimes at a more advanced state of the disease. In this disease, as in all others where indirect debility is induced by excess of arterial action, bleeding, to be useful, should be practised with great caution. Large bleedings can never be used with propriety where this state has long existed, and the longer it has existed the less should the quantity be.

The blood drawn from a vein was uncommonly florid when drawn while arterial action was vigorous and the pulse frequent, but lost its floridity as soon as the functions of the lungs became impaired, or indirect debility supervened. In the different degrees of prostration it manifested the following different appearances: 1. A copious deposition of a red precipitate to the bottom of the receiving vessel. This was

deemed to be the first indication of a tendency to dissolution in the blood. 2. Blood of a darker complexion, separating imperfectly with the serum bloody, and the crassamentum like blood half coagulated. 3. A total dissolution of the whole mass, appearing like molasses or tar, without a separation, and very black. Some have imagined that this tendency to dissolution is occasioned by the miasmata acting as the cause of the measles; but such an hypothesis seems improbable, as it occurs in pleurisy, and in many diseases of excessive, long-continued inflammatory action; though it must be confessed that it occurs very often in such diseases as are called contagious. That the blood should be completely dissolved, and, in a few hours after, manifest a buffy coat, is almost an unanswerable argument against the solvent power of the miasma. This I have witnessed in measles, small-pox, pleurisy, yellow fever, and in other diseases. Does not this fact carry with it a strong presumption against the vitality of the blood? In the dissolved state it cannot be supposed to possess life, and it is equally difficult to suppose that it could recover its vitality in a few hours; nor is it probable that new blood could be so suddenly generated, when the chylopœtic functions are almost, if not altogether suspended. The blood was seldom sizy in this disease: the grade of the epidemic was so malignant that this appearance was seen only in mild cases.

Purging, though not as essential to the cure as blood-letting, was, nevertheless, a very useful remedy: calomel acted like a charm in removing the corroding nauseous sensation at the stomach. It was more grateful to that organ than any other purge, and required to be repeated every second day, or oftener, as there was a constant re-accumulation of that green acrid matter that was sometimes ejected from the stomach on the first attack; and this disposition commonly lasted four or five days. Where purging was neglected in the commencement, the evacuations from the intestines were often of a dark green, brown or black complexion, just as it happens in other malignant fevers.

Emetics were sometimes useful in removing excreted mucus from the bronchia and trachea, though they could not be used with propriety in the early or inflammatory state, because they increased the inflammatory action, and particularly the determination to the head. They often afforded a temporary relief of the nausea at the expense of increasing the fever. They proved more useful in the advanced state of measles,

when indirect debility began to progress, provided no decided local affection forbade them.

Antimonials were certainly improper medicines in this disease: they depressed the pulse, and seemed to act too much like the causes of the disease. Are not antimonials equally unfit remedies in all malignant fevers where the tendency to indirect debility is great, and more especially in those called contagious, where the *vis nocens* is so prone to induce the same state of the system?

Blisters were equally inapplicable in the first state of this disease, but co-operate powerfully with emetics in arresting the progress of indirect debility in the advanced state of measles, and sometimes called forth dormant excitement to great advantage.

Opium was equally inadmissible in all its forms, unless towards the latter state, when fever did not contra-indicate its prescription for the cough, which was often the last troublesome symptom, and seemingly occasioned by the action of a small portion of the pulmonary vessels.

Although measles generally run their course, in all cases, nearly in the same number of days, they manifested a trait discoverable in all malignant fevers; viz. a disposition to terminate in a shorter space immediately before they disappeared. This signal for the cessation of hostilities is very remarkable in scarlatina, yellow fever, dysentery, jail-fever, and others. The action of the morbillous fever produced one effect which I never saw from any other morbid action: it increased all the symptoms of gonorrhœa, and fomented that local action to a degree unknown to me. It was moreover evident, that, from the commencement of the measles to the termination of our autumnal epidemic, that disease not only resisted the common remedies, but yielded, in many cases, only to all the force of the whole train of antiphlogistic remedies. The difficulties attending the treatment of this disease, formed, during that period, a subject of astonishment and complaint for the practitioners of our city.

I should not have been thus particular in detailing the phenomena of measles, were it not that the popular opinion supposes them to be void of danger, and, therefore, seldom requiring the interference of a physician. A more hazardous notion cannot exist; for the neglect of no disease originates more deplorable consequences, even where the patient recovers. It therefore appears to me that this constitutes the most im-

portant part of the subject. I shall enumerate some of the most common consequences of neglected or mal-treated measles; although the limits of a letter must abridge the list considerably.

1. Effusions in the lungs. 2. Effusions in the brain, constituting what are called cases of hydrocephalus internus: these soon produce death. 3. Debility of the lungs, inviting disease by constant predisposition. 4. Cough, often terminating in consumption, as well as the state immediately preceding. 5. Slow convalescence by the tedious process of expectoration. 6. Inflammations of the eyes were common: the palpebræ were highly inflamed both during the disease and long after its decline, and the cornea was often so completely covered with an excrescence as to obstruct vision partially or entirely: this was both a symptom and consequence of measles. This last symptom occurred principally among children, and began about the second or third day. 7. As ear-ach was often a symptom, so internal ulceration was a consequence of measles; and these frequently proved very difficult to cure. These occurred mostly in patients under puberty; and I met with several cases that resisted all the ordinary remedies, and yielded only to a salivation. Some were cured by injecting weak solutions of corrosive sublimate into the ulcerated ears. 8. Eruptions on the skin, comprehending several anomalies, but consisting more frequently of a thickening of the cuticle similar to the affection of the cornea, which may be justly viewed as the scarf-skin of the organ of vision.—These probably make no figure as to the whole of the evils resulting from neglected or ill treated measles; but they are sufficient to deter all reasonable men from trusting to the wild aberrations of nature in the cure of so dangerous a disease: and it is certainly a very consolatory reflection that none of them followed measles where *bleeding* and *purging* were judiciously used.

Before I relinquish this subject I must be permitted to describe one case of measles: to omit it would be to lose a pathological curiosity, the parallel to which (so far as I know) is not to be found in the annals of medicine.

On the 15th of February I visited Ann Watson, aged eleven years, who had been attacked with the usual symptoms of measles five days before. She had been an healthy child from her infancy; and the immediate cause of calling for medical assistance was an affection of the throat unusually violent for this disease. Excepting this symptom, nothing uncommon

was discovered until the eighth day, when a coarse furfuraceous scale was discovered on each point where the eruption had originally appeared: from these this thickening of the cuticle diverged, and in three days it enveloped the whole surface of the body in one universal scale. This induration of the cuticle increased daily, and, by the fifteenth, it had acquired the hardness and thickness of the nails, and apparently in no respect different from them. This scale was not confined entirely to the external surface of the skin; it was perceptible (though in a smaller degree) on the insides of the ears, nose and mouth, and as far down the œsophagus as could be seen. Previous to the eruption, as soon as the cough began to agitate the lungs, an unusual degree of redness instantaneously diffused itself over the face; not like the hectic blush (so common in inflammatory affections of the lungs), confined to the cheeks, but extending over all the face. So violent was the influence of the lungs upon the skin, that this scarlet efflorescence, in some long paroxysms of coughing, extended over the whole body. The hair was materially interested in this symptom. The same substance was generated, in great abundance, from its roots, and seemed to be occasioned by a superfluous secretion of the substance forming the hair. Every hair acquired, at its root, the thickness of many hairs, and a whiteness, strongly resembling the *Plica Polonica*,* as described in books. Such was the thickness and hardness of this horny excrescence, that scales of it were frequently pared off without the least sensation. For some days before death, the least motion of the body produced extreme pain; and, when she walked, a sound was emitted from the body as if she had been cloathed in buckram. On the twelfth day she became considerably blind and deaf. The cornea thickened until it put on the appearance of having been burnt, and total loss of vision ensued. The deafness did not progress in the same ratio, as the hearing continued, in a small degree, as long as she lived. The sense of smelling was also considerably impaired. The sense of tasting was entirely lost. Sugar and salt, and even brandy and milk, had the like effect on the tongue and fauces. The understanding was not impaired, nor the least symptom of derangement discoverable through the whole disease. From the commencement of the induration of the cuticle, the symptoms became more and more aggra-

* Is this disease, so common in Poland, an increased secretion and deposition of the same nature?

vated. The cough was frequent, hard and unproductive, but little pain was felt in any part of the thorax, and no expectoration appeared to the last. The greatest pain was experienced in exercising the muscles of deglutition, and the thought of attempting it frequently occasioned the most violent convulsions, in one of which she expired while attempting to drink, on the nineteenth day from the attack. Every idea, however remotely connected with the act of swallowing, occasioned the greatest trepidation of mind, and agitation of the whole nervous system: in short, these symptoms recalled to my mind all the horrible scenes of a most deplorable case of hydrophobia which I witnessed at eleven years of age. No pain of the head was complained of from the beginning. The most excruciating pains through the whole alimentary canal were felt, though not constantly. On my first visit she was bled, and a temporary relief from the cough was obtained. The blood was uncommonly sizy. Every attempt to evacuate the intestines completely proved abortive, although the attempt was made daily, for fifteen days, with the most powerful cathartics. The warm bath was resorted to in the violence of pain; but the relief produced by immersion, however long continued, was scarcely perceptible. Opium, for the four or five first days, produced a temporary relief, but at length it effected nothing more than the same quantity of water. With a view of relaxing the rigid cuticle, the body was covered with warm olive oil, with the longest respite from pain that she experienced; and large doses internally afforded considerable alleviation of the tormina of the intestines.—I regret that I was not permitted to examine, by dissection, the viscera and other internal parts, and must, therefore, leave the subject for the contemplation of the learned.

ARTICLE II.

FREDERICK HOFFMAN'S ESSAY *on the dissimilarity of* FIXED VEGETABLE ALKALINE SALTS; *with Observations and Remarks on the Changes which the Septic Acid undergoes by Combination with those Alkalies, by Dr.* MITCHILL.

IT has been repeatedly objected to me, that the *nitrous* acid of the shops does not correspond with the character which I find to be possessed by the *septic* acid. It is true that, in some of my early essays, published during the years 1795 and

onward to 1798, I did employ the term "nitrous" as a sort of synonime to the word "septic:" but then I always enclosed it within a parenthesis, and my object was to lead the mind towards that acid as having a radical similitude with the one I was describing, though without any intention of affirming their identity. I now find that this has been misconstrued, and that some persons understand me as having affirmed that the nitrous and septic acids were so exactly alike, that what was true of one was in all respects true of the other.

Now, this is a serious mistake in me, if ever I said so, or in others, if they have ascribed to me what I did not say. In 1796 (see Med. Rep. vol. ii. p. 235—240) I stated this difference, as I thought, very plainly, and at considerable length. I repeated this sentiment, with some variation of statement, in 1797 (ibid. vol. i. p. 217.) To these I added a number of other considerations in 1799 (ibid. vol. iii. p. 14 & seq.), showing the dissimilitude of these two acid products. More was offered on this point in 1801 (ibid. vol. iv. p. 184-5), exhibiting still further the difference between the acid formed among corrupting materials, and the acid obtained by decomposition of salt-petre. In the same volume, p. 190 and 262, there are other views of this question, intended to put my meaning out of doubt.

That part of the history of putrefaction which I have attempted to explore, and to which I have called the attention of the learned world, *is the series of phenomena which occur from the moment of the formation of septic acid by any of the processes which produce it, to the fixation or neutralization of it by pot-ash.* My attention was directed to this period, because it had been overlooked by almost every observer, as it yet is by the greater part of scientific men; although it certainly embraces the most important portion of the facts connected with animal and vegetable disorganization. The history of the *nitrous acid had, I well knew from the beginning, been laboriously and profoundly explored.* With that I professed to have little to do, but employed myself chiefly in investigating the character and operation of *the acid of septon*, before it underwent the alteration which gives it the qualities possessed by the *nitrous.*

Still it is taken for granted by the philosophers of our day, that the acid obtained by decomposition and distillation of salt-petre is the very same and identical thing which was formed in the midst of corruption, and among putrefying materials, by a chemical combination of septon and oxygen. This is

as confidently asserted by them as if it was a matter of fact. Indeed, it is so absolutely credited and taken for granted, that the *natural history* of the acid, from the time of its formation to the time of its association with pot-ash (which is the most interesting by a great difference), has been almost wholly overlooked; while its *artificial history*, after its separation from pot-ash (by far less important), has attracted an uncommon share of attention.

But men of science did not always confound things at this rate. There was a time when opinions were stated as such, and not obtruded upon the world roundly and positively for realities.

Fourscore years ago the German chemists knew that salt-petre, formed from *distilled nitrous* acid and pot-ash, by synthesis, in a laboratory, differed from the neutral salt produced when septic acid combined with that alkali by the natural process, in heaps of dung and rubbish. LUDWIG had remarked that, notwithstanding all attempts to saturate them exactly, there would be some acrimony left in this *nitrum regeneratum;* to correct which a portion of quick-lime must be added.

The difference between natural salt-petre and regenerated salt-petre was so considerable, that the latter was by some affirmed to be unfit for making gun-powder. It was declared to have too little strength for that purpose. Others, however, were of a different sentiment, and declared *regenerated* nitre as good as the *natural.* (Junckeri Conspectus Chemiæ, tab. lxi.)

STAHL knew the destructibility of pot-ash: for when salt-petre was exposed to a torturing fire, for a long time, in an open vessel, it was wholly dissipated; both the acid and alkali disappearing. And he also knew, that if a mixture of salt-petre and charcoal was deflagrated in a tubulated retort, that both the acid and the alkali would be destroyed or decompounded; scarcely a vestige of pot-ash being found in the retort, or of nitrous acid in the receiver.

KUNKEL too had ascertained, by experiment, that putrefying blood afforded both septic acid and fixed alkali enough to form salt-petre. From one hundred pounds of corrupted blood, he obtained, by evaporation and crystallization, more than five pounds of genuine nitre. Juncker himself was perfectly aware of the convertibility of alkaline salt to nitre, by exposure to fœtid exhalations.

When an alkaline salt has been exposed too long to intense

fire, the watery parts are expelled, and the salt itself degenerates to an earthy, fixed and insipid consistence.

The following curious fact is told of the convertibility of nitrous acid into pot-ash:—If the alkali, in its dryest state, is mixed with spirit of nitre, and turned to *nitrum regeneratum*, and afterwards, by aid of charcoal in close vessels, this factitious salt-petre is decomposed and turned back to *nitrum fixum*, or pot-ash, there will be found remaining a much larger quantity than was originally made use of. They both contain septon, and their constitution is probably more nearly allied in many particulars than is usually supposed.

It is the vulgar opinion that acids and alkalies are the opposites of nature, because of the effervescence they make on uniting, &c. but the Stahlians were of a different belief, thinking that their readiness to combine with each other indicated rather a similarity of constitution and a homogeneity of corpuscules. (Juncker. Consp. tab. vii.)

There is something uncommonly singular in the lime-stone caverns which furnish the salt-petre earths in Virginia, North-Carolina and Tennessee. These excavations are composed altogether of rocky strata of calcareous earth, or carbonate of lime. They extend for considerable distances towards the centre of the mountain in whose sides they exist. Neither rain nor sun-shine ever reaches them. In the bottom of them a salt-petre earth is found, which, after lixiviation, if carried back and replaced, becomes gradually impregnated with salt-petre again. There are no corrupting materials here to supply septic acid. There is no process of incineration to afford pot-ash. All that is discoverable is the crumbling and mouldering of the calcareous rocks which form the caverns. And in this rubbish or scrapings of the floors are found a large portion of *calcareous*, and a smaller quantity of *alkaline* nitre. To detach the portion of acid which is associated with the lime, the hunters and salt-petre-makers find it necessary to add a parcel of wood-ashes to the earth brought out of the caves. The alkali of the ashes attracting the acid from its calcareous basis, furnishes a greater quantity of salt-petre, and of a better quality, than can be procured by any other method. This *artificial* nitre, added to that previously formed by the *natural* process, makes up the amount which is procured. From a careful consideration of the facts afforded by the *natural* process of salt-petre-forming in these vast subterranean excavations, there appears no other way of accounting for the production of both a *portion of the native pot-ash and all the*

nitrous acid, than by the decomposition of the calcareous rocks, and the formation of the two materials of salt-petre from the constituent parts of these strata of lime-stone; a part of which seems to change into pot-ash, and another part into nitrous acid!

A somewhat similar fact occurs with regard to the conversion of volatile alkali into nitrous acid. If corruption, instead of going on in open air, is made to take place in a closed apparatus, the ammoniac gradually disappears, and the mass changes to a sulphureo-terrene, or, in some measure, *to a nitrous consistence.* This is analogous to the changing of nitrous acid to ammoniac during the solution of tin, and in other experiments.

BECCHER plainly affirms the mixture of septic matter with the water of the ocean. He supposes a quantity of nitrous matter derived to it from the various kingdoms of nature, whereby salt-petre is superadded to its common salt. This corresponds to NEWMAN's experiment of obtaining *aqua regia* from sea-salt, and of PRINGLE's experiments of some of it promoting corruption. (See Trans. of American Philosophical Society, vol. v. p. 140.)

But above all the pieces that I have met with in the older writers, HOFFMAN's *Essay on the dissimilar Nature and Properties of Fixed Alkaline Salts* contains the most pointed evidence of difference between pot-ash after it *has been* combined with septic acid, and pot-ash which has *never been* so combined. His observations are so remarkable that I deem them worthy of a full translation:—"It has been hitherto firmly believed, by experienced chemists, that the nature of the lixivial salts prepared by *calcination* and *incineration*, was not different, but the same, and that they possessed *equal* fitness for the purposes of medicine and the arts; and, indeed, this would seem to be the case, if we merely consider their mixture with acids of various strength, their effervescence, their saturation, and conversion into *salia salsa*, or neutral salts. But it will be more clearly and undeniably evident, from experiments I am about to relate, that the constitution, composition and qualities of these alkalies is *not the same*, and that a peculiar and specific difference prevails between them.

"1. *Nitrum fixum*, or pot-ash prepared from salt-petre, deflagrated with charcoal, undergoes strong ebullition on having oil of vitriol poured upon it, and exhales a disgusting smell like aqua fortis; but this does not happen if the experiment be made with salt of tartar or of wood-ashes.

"2. If salt of tartar, or alkaline salt (as pot-ash is called by way of distinction), is melted in a crucible, and powdered charcoal be added to it in its melted state, to the amount of about half the quantity of the pot-ash, then the mass, on being poured out, is of a reddish colour, of a fœtid, sulphureous smell, not unlike the *hepar sulphuris* ordinarily prepared from salt of tartar and common brimstone: but if the *fixed nitre*, or that caustic salt which is prepared with regulus of antimony and salt-petre, is melted, and charcoal dust added to it in fusion, it does not undergo the smallest alteration of colour, smell or taste, but remains white and very pure.

"3. If with the salt of tartar, which is usually prepared by an extemporaneous process of burning together two parts of salt-petre and one of tartar, there be mixed a tolerably strong spirit of vitriol, instantly an odour like aqua fortis rises; but this never happens with pure salt of tartar, or any lixivial salt prepared from vegetables by incineration.

"4. There is a remarkable difference between the salt of tartar, prepared from crude tartar, *with* an admixture of salt-petre, and that obtained *without* it, as well as between the former and lixivial salt itself; in this respect particularly, that if you pour oil of vitriol gently and gradually upon the former, a stinking, disagreeable odour arises, and the surface becomes covered with a blackish pellicle, together with rising froth; and, indeed, the body of the liquor itself becomes blackish: but most certainly these appearances never happen to pot-ash.

"5. Clear glass can never be made from salt of tartar and sand; but glass of elegant transparency can be formed from the alkaline product of salt-petre and tartar (§ 3), and likewise from pot-ash.

"6. There exists no doubt among those who are addicted to chemical researches, that a highly caustic and alkaline salt may be prepared from two parts of salt-petre and one of regulus of antimony, melted together by a strong fire. This, freed from foreign particles by solution in water, and afterwards dried, acquires an *intensely red* colour by being mixed and digested with highly rectified spirit of wine. But if the like spirit of wine be poured upon the caustic alkaline salt prepared from two parts of salt-petre and one of tartar, dissolved and purified by water in the same manner, there is no tinge or colour of red to be seen.

"And although a tincture of extraordinary virtue, and of a *golden* colour, may be obtained by pouring highly rectified

spirit of wine upon the salt of tartar prepared from *tartar alone;* yet the like never happens when the experiment is made with pot-ash, or with that salt of tartar which is formed from *salt-petre* and tartar.

"7. The waters of many of the medicated springs which are cold, and called *acidulous*, or are hot, and called *thermæ*, on undergoing a gentle evaporation, deposit a lixivial salt, which nearly resembles other salts: in this, however, there is a difference, that these lixivial salts of the springs, on being melted with powdered charcoal, are changed to *hepar sulphuris:* but this has not been observed to happen when the like experiment was made with the caustic alkali by regulus of antimony, nitrum fixum, or the alkali from salt-petre and tartar.

"These experiments amply and satisfactorily prove that *common salt of tartar is widely different* from the *alkaline salt which is an ingredient of salt-petre:* for the former, by affusion of oil of vitriol, salutes the nostrils with a fœtid smell, forms a less transparent glass, partly mingles with spirit of wine, and strikes a colour which the nitrum fixum, or the alkali from salt-petre and tartar never do; while, on the other hand, those alkalies which are ingredients of salt-petre, exhale, on being mingled with oil of vitriol, *the nasty odour of aqua fortis.*

"Hence it is correctly inferred, that salts, and other bodies of a very fixed nature, may conceal within them volatile, sulphureous and oily particles, by an attraction too strong for the *most intense fire to overcome;* while, at the same time, their connection is such, that, by virtue of the *attractions* consequent upon mixture with other bodies, these hidden materials may regain their distinct characters, and burst again upon the view."

As these facts were published as long ago as 1736, it might be presumed that the gentlemen who undertake to judge of scientific discussions were acquainted with them. But finding, of late, that even they who criticise and publish opinions to the world knew nothing about them, I determined to exhibit them in an English version. Why are all these instructive phenomena forgotten and overlooked? Wherefore are the truths disregarded or rejected which our predecessors laboured so hard to accumulate?

But to show the distinction in this case the stronger, the authority of BOERHAAVE might be cited. This great chemist affirmed (2 El. Chem. proc. 134), in the account he

gives of Glauber's spirit of nitre, "that there was never any acid discovered, in any single experiment, like the acid procured by that process." And I am of the same opinion. This acid, and all its derivatives, are certainly *artificial* products, and exist no where but in the laboratories and in well-stopped vessels; while the original septic acid exists copiously among the ruins of organic matter all over the earth.

On the whole, I wish the gentlemen who attend to this subject to consider two things; first, that pot-ash, or the vegetable alkali, assumes an endless variety of forms, without being adulterated by foreign ingredients, and is not that simple, uncompounded element which some of them pretend to think it: the other is, that not a particle of *nitrous* acid ever existed in nature; in the laboratory of nature *septic* acid is formed, and oftentimes associated to pot-ash; and by that association, and by the process employed to extract it *by art*, THE SEPTIC ACID IS CHANGED TO THE NITROUS. And it is a most happy event for mankind that it is so; for thereby an alteration is wrought both in the constitution of the acid and of the alkali, very beneficial to living beings. Such being the facts, it clearly follows, that all the experiments made upon *nitrous acid and its derivatives* have no bearing or application to the *original septic acid as engendered or evolved in the putrefactive process.* The man must be very dull who affirms that *nitrous compounds* are the common agents of pestilential mischief; though he must be still more dull if he denies *oxygenated septon*, in its various forms, to be the noxious cause which alkaline salts and earths universally neutralize and subdue.

Through want of attention to these points of difference, it is probably to be understood wherefore my meaning has been so often perverted. Without intending to think or to reason wrong, the philosophical men have charged me with mistakes from which I hope I am free.

I request that they who have misunderstood me may peruse this piece, and reconsider what they have written and read. Particularly I request this of CHRISTOPHER ALBERT, who printed a Dissertation at Erlangen in 1798, *de Luis Bovillæ Origine et Naturâ;* and of NATHANIEL WEEKES, who defended an Essay *de Flava Febre*, at Edinburgh, in 1799. I would make a similar request of GEORGE LEE, of Philadelphia, if death had not removed him from us; though this amiable and candid man declared to me, in a letter written a little before he became disabled by his infirmities, *that he*

would never contradict me again. I give the same invitation to HUMPHRY DAVY, of the Royal Institution, and to the Monthly Reviewers, of London; to Dr. J. C. SMYTH, to Mr. GUYTON, and to all the advocates for destroying contagion by fumigation with nitrous vapour and oxygenated muriatic gas, on both sides of the Atlantic; and to the writers of speculations upon infectious diseases, who have honoured either myself or my doctrine with their notice, in Philadelphia and Boston. As to the critical remarks made upon Dr. BAY's Dissertation on Dysentery, in Med. Rep. vol. i. p. 241, they were inserted at my suggestion and request, by the learned and polite gentleman who penned that review. When chemists shall have been taught, by further experiments, how ignorant they are of the true constitution of *nitrous acid;* and, from additional observations, how much they have yet to learn concerning the exact composition of the *vegetable fixed alkali*, they will lay aside a part of the positiveness with which they have conducted this discussion, and practise somewhat more of condescension and forbearance.

New-York, March 20, 1803.

ARTICLE III.

OBSERVATIONS *on the* SENSE *of* TOUCH; *showing that it may be employed to determine the Thickness of Natural Bodies, as well as their Heat, Cold, Shape, Smoothness, &c. By the Rev.* DAVID WILEY, *Principal of the Columbian Academy at Georgetown (Maryland.) Communicated to Dr.* MITCHILL, *March* 3, 1803.

OF all the external senses, that of the touch or feeling is supposed to be the most obtuse. But perhaps it is not so much so as is generally imagined. It has been less the subject of philosophical speculation than any other of the senses. Its organs are not confined to any particular part of the body, but, in a greater or less degree, appear to be diffused over its whole surface. In this respect it differs materially from seeing, hearing, smelling or tasting. It has also been supposed to differ from the former three, in requiring the immediate agency of its object on the organ to produce the sensation. Air is the medium of sound—light, of vision. By these media we may obtain some knowledge of the distance, position, magnitude, figure, motion, &c. of even very distant objects. We cannot feel or taste a distant object. This is without doubt.

But it is not so certain that the object must be brought into absolute contact with the organ; at least their absolute contact does not alone appear to be sufficient to explain all the phenomena. But whether it be necessary to call in to its aid the principle of attraction or repulsion, or some other principle hitherto unknown, or already known, it is not designed at present to decide. A statement of facts is the most that is intended, and of facts chiefly relating to *feeling*. They may not be altogether new, or unobserved by others; but, as far as the writer can learn, they have, at least, been but little attended to. His attention they have in some measure occupied for several years. Little mention, however, has been made of them, unless to a few individuals, and then rather by way of inquiry than of communication. The facts are briefly the following:—That by *feeling*, the knowledge of something more than the mere surface of bodies may be attained. By barely *touching*, or rubbing the hand slightly over the surface of metallic plates, something of their thickness may be known. If one is thicker than another, it will be discovered. This fact has been ascertained by repeated experiments on copper, tin, iron, &c. To make the experiments fairly, the plates, when they are thin, must be bent into a globular, cylindrical, or arched form; otherwise their differing in thickness might be supposed to be discovered, from their yielding to the pressure of the hand in a greater or less degree. But so far is this from being the case, that it is only necessary to touch the plates in the slightest manner. The plates ought also to be of the same kind of metal. They may be of equal polish, and of the same shape: nor will their temperature affect the experiment. They may be either hot or cold. The experiments were made chiefly on copper stills, kettles and boilers, and sheet-iron and tin bent in form of an arch. A very small difference in thickness is found to be discoverable by merely passing the hand gently over either the convex or concave surface. Some experiments have also been made on glass, stone and wood. The result was much the same, unless that it appeared to require a greater difference in thickness to cause a manifest difference in *feeling*; and that still more in wood than in glass or stone. Nor is it conceived that it requires any peculiar delicacy or acuteness in *feeling*, to be capable of making and perceiving the truth of such experiments. As in our other senses, so in this, the more perfect and acute the organ, the more accurate the decision: but it is supposed that every one possessed of feeling at all may make the experiment

in some degree, and that the capacity to make the decision belongs to the nature of the organ. To what degree of accuracy such experiments may be carried, it is not pretended to say. The principal fact alleged is, that *feeling* has not merely the surface of bodies for its object. Something may be known of their thickness. To establish this, it is not necessary to be capable of discerning by *feeling* that one plate is a quarter of an inch thick, and another but half a quarter. It is sufficient to be able to distinguish the one from the other, and pronounce which is the thicker; and this can be done with the greatest certainty. Such are some of the facts. What is to be inferred from them? They cannot result merely from contact. Our organs of *feeling* will not come into contact with more matter on a thick plate than on a thin one. The phenomenon must be accounted for, if at all, on some other principles. On what? Let those who have leisure and opportunity endeavour to determine. In addition to such experiments as have been already mentioned, let attempts be made to ascertain the difference of feeling between substances of different specific gravities, and of the same thickness; as, for instance, between gold and silver, gold and copper, silver and copper, silver and lead; between different kinds of stone, as marble, slate, limestone; between different species of wood, both when green and when seasoned; and between different kinds of glass; and also between plates of different kinds of metal, stone or wood, of thicknesses inversely proportional to their specific gravities. The plates may be polished, gilded, plated or varnished, to render their surface as nearly of the same texture as possible. Experiments might also be made on thin cakes of tallow, rosin, wax, and on crockery ware. It might even be worthy of examination, whether something respecting the health, vigour and soundness of animal bodies might not be discovered by *feeling*.

To some, perhaps, the subject may, at first view, appear to be trifling, and little worthy of notice. But let it be considered that it forms a part of the philosophy of human nature; that it must materially affect the theory of sensation, especially that of *feeling*, which, in some respects, may be accounted a genus, comprehending all the other external senses; that it may afford additional evidence for the existence of certain properties of matter, or bring to light some hitherto unknown property; that it may be applied to a useful purpose, in the common concerns of life, by affording an easy mean of judging of the thickness and soundness of any vessels of metal, stone and glass.

ARTICLE IV.

MISCELLANEOUS REMARKS *on the* SMALL-POX *and* KINE-POCK: *Communicated to Dr.* MITCHILL *by Dr.* MOSES YOUNGLOVE, *in a Letter dated New-Lebanon Springs, February* 12, 1803.

SIR,

CONSIDERING the hopeful progress of vaccination, any communication and discussion relative to the *small-pox* may, to some, seem unseasonable; yet, notwithstanding the flattering prospect that the former will generally supersede the latter, as to the practice of inoculation, in all lettered States, at a time not very far distant, the prevalence of the latter, for reasons well known, is still considerable; and since, through its very infectious nature, and the great intercourse by commerce, this may, for a time, remain the case; and since investigations on any disease are more or less favourable to the study of every kindred disease, I take the freedom of offering to your inspection a few desultory remarks, with reference to what hath appeared in several publications relative to the small-pox.

A question is controverted by pathologists, whether two or more contagious diseases can operate at once on the same subject. It appears, by the last number of the Medical Repository, that Dr. J. R. Coxe, in his late treatise on vaccination, which I regret that I have not seen, advocates the affirmative of this question; while Mr. J. Hunter, Dr. E. Darwin, and several others, maintain the contrary; and some of them make of that opinion a theoremic basis to very important deductions. From long and diligent observation, I am fully confirmed in Dr. Coxe's opinion in the premises. Many instances have occurred of my patients having, at the same time, the small-pox and measles, the small-pox and chicken-pox, the small-pox and the venereal disease, the small-pox and the mumps, and the small-pox and whooping-cough; and, as far as I could see, both diseases, in each case, proceeded in their usual progress, without any suspension of the operation of the one by the other, as several writers have supposed. Nor did the two diseases, that I know of, coalesce, and form a third intermediate *something of a disease*, as Dr. Darwin ludicrously supposes (Zoon. § 33. 2, 9), though they, in several cases, appeared to be in even progress; and in one in-

stance, about the year 1785, I had a patient, when the measles were prevalent, who, about the thirteenth day after inoculation, and after pretty severe symptoms, broke out with the small-pox and measles both at once; but the latter appeared entirely apart, in blotches of an inch or two diameter; after which both happily proceeded in their natural operation.

As to the opinion espoused by Dr. Coxe, and other reputable authors, that some persons have had the small-pox more than once, as I have no proof to the contrary, so neither have I, in my practice, seen any evidence in favour of it. I once, through mistake, inoculated a family with infection of the chicken-pox instead of the small-pox, when the operation produced, though slight, yet did not undeceive me (I being then young in the practice), till the person out of whom I had taken the infection happened, under my eye, about a year after, to break out with the natural small-pox, which admonished me to inoculate them anew with the true infection; but had it not been for this seasonable discovery, these patients might, many years after, have had the small-pox by the natural way, and I might have confidently asserted that they had the disease a second time.

I have also known several instances in which practitioners of little experience have inoculated for the small-pox with matter adulterated with the itch, or the like, which producing a sore, and a kind of eruption, were pronounced safely through the intended disease, yet have afterwards caught it, and then been said, as confidently, to have it a second time.

It is also asserted, by some writers, that there are, in every country, some to whom the small-pox cannot be given by inoculation, although they have never had it before trial; but in the course of my experience during the revolutionary war of these States, and since, on, I believe, not less than thirteen or fourteen thousand subjects, I have found none such when my infection was good: though I know several persons who, having had the disease very slightly, are generally thought to be of that description.

Nor have I ever, but once, seen the operation of the spurious or imperfect small-pox mentioned by Dr. Coxe sometimes to occur, which was about thirteen years since, when I began inoculation, between Kinderhook and Claverack, with old infection, procured from a neighbouring physician: but very singular was its operation: its taking effect was generally uncertain without repeated inoculations; its whole subsequent operation was

mostly so slight, and often partial too, producing only a scabby eruption on the inoculated arm, that my utmost efforts could not, in every instance, produce an operation fully satisfactory, though a very few had the disease severely, with a natural appearance enough. This continuing the case for several weeks, while I could procure no other infection, but inoculated every succeeding class and family with the best I could select from the preceding, I was constrained, merely on that account, to desist, though reluctantly, after having inoculated nearly two hundred.

There is a query (Med. Rep. vol. i. p. 103) whether, in inoculation with the small-pox, the insertion of an unnecessary quantity of the matter will increase the virulence of the disease? To this I answer, that though I have never plainly perceived any injury from this source on strong subjects, yet on tender infants, and weak patients in general, I have thought the insertion of much, especially by deep incision, and more especially if repeated in several places, to be very injurious, apparently through the unnecessary corrosion of the skin, cellular membrane, and even muscular flesh, and the consequent fever, depression, and the early and unnatural absorption of the matter into the mouths of the lymphatics.

As to the advantage there mentioned from a dilution of the virus before ingrafting, I am fully of opinion that it does in no case tend to the proposed mitigation of the disease, but that it is highly improper, rendering the communication of the disease far less certain, if a mixture of water, or any other extraneous matter, be unnecessarily admitted. And hence the reason is evident why the first limpid matter in the pustules is so very sure to communicate the disease by inoculation; this young matter being naturally the most pure from any mixture of common pus, or other foreign material.

Dr. Darwin queries (Zoon. § 33. 3, 1), whether the infection of the small-pox can be effectually cut out again after inoculation. I can partly answer this, by stating that, about fifteen years since, on the alarming illness of one of my patients (at Lunenburg, near the city of Hudson), with the appearance of an incipient yellow fever, on the third day after an inoculation which had undoubtedly taken effect, I freed him from it by cutting out a piece of skin less than a dime; but that I have since failed in a similar attempt, the fourth day after inoculation, in a manner, however, indicating, that if my incision had been made wider and deeper it might have

succeeded: for about the ninth day after inoculation, as in other cases, the sore was surrounded with the true pock inflammation, and the eruptive progress following was as usual.

Dr. Darwin (Zoon. § 33. 2, 10) acknowledges his recent conviction, that the variolous matter never circulates in the blood of any person infected with it, as evinced by several experiments of inoculating with the blood without effect. Yet, notwithstanding this rational conviction of him and others, the position is controverted, and, as far as I am acquainted, generally discredited. As for myself, I was more than twenty years ago convinced of its truth, and have since been more and more confirmed in this conviction, by having observed the following among other evidences of it.

1. Generally about five or six days from the inoculation all its observable operation is confined to the infected spot, or very near it; for a few days longer its progress from that is mostly slow and gradual; and then it first affects the glands and muscles on the same side, about the shoulder, neck and head.

2. The following progress of the eruptive symptoms is very similar to that of various other potent irritations.

3. I have inoculated, I believe, much more than a hundred women, in the early and middle stages of pregnancy, with safety in most cases; and have frequently, long afterward, inoculated the children so born of them, who have invariably undergone the usual operation of the disease, which might not have been the case had the variolous matter pervaded them in utero.

Nor hath the argument any weight with me, when some former writers urge the infectious nature of the pustules emanating from the blood, as a proof of the presence of variolous matter in that fluid; for I have diligently sought, in vain, for any evidence of infection in the incipient pustules before maturation; and they never maturate but where they are exposed to the air; a portion of which may, perhaps, for that end, form a chemical union with some of the secretions of the patient, essential to their contagious maturity; and hence, in abortions from this disease, in the last stage of gestation, the pimples frequently observable on the fœtus have none of the variolous matter in them.

4. I have never known any person take the small-pox from the blood, though exposed to it, fresh drawn, at the most likely season, after the absorption into the lymphatics of a profuse and crystalline eruption, which is sometimes astonishing, both as to the quantity of matter receding from sight,

and the quickness of its recession; insomuch, that I have once seen an instance where the bladdery cap of a large, full, remaining crystalline pock, was hastily pulled off, with a view, by applying a sponge, to hinder the retreat of its contents into the system, when it instantly ran in under my eye, before the sponge could be properly applied, and that too on the under-side of the patient's leg, in opposition to centripetal attraction. Yet, in some of these cases, when induced by improper treatment, on a seasonable resort to a warm and cordial regimen, and to the proper internal remedy, one may the next day see the happy return of the matter in large blisters, at or very near the pustules it before filled (though now so far divested of its late keen contagious virulence as to be very uncertain to inoculate with). It therefore appears to me probable, that its retrogression was only unto the mouths of the lymphatics, which naturally inflames them, indurates their glands, and induces dangerous fevers, by the associate and sympathetic motions of the different parts of the system.

The writings of some transatlantic authors, formerly of credit, would induce a belief that it was once thought there, that the small-pox was not only modified in operation by particular scites and seasons of the year, but was frequently originated by these causes. These notions appear as the mere reveries of inexperience and error: but many descriptions of the disease, its operation and proper management, by writers of the best credit, such as Huxham's little black pock, which never was seen here in our day, &c. and many observations by Sydenham and others, his cotemporaries, equally variant from our experience, may perhaps be credited as then correct, by supposing a general change in the operation of the disease, gradually down the lapse of time from them to us; which is to me the more probable, because I think I can distinctly trace, by memory, a transition of this kind since I began to practice in the disease, which is about twenty-eight years. I see no more of the glandular suppurations in the latter part of the disorder, formerly so frequent and unavoidable. I can say almost the same of the rash, an eruption so common formerly at the close of the eruptive illness. Also the scarlet, or sometimes crimson efflorescence, well described by the acute Dr. Brown (Elem. Med. p. 219 and 421); also a border of like appearance round the inoculated spot on tender infants, near the time of eruption, varying in different shades of delicate colours to the eye, in transient and momentary flushes. The two last I have not seen these ten or twelve years, though formerly

of pretty frequent occurrence in my practice. And, in general, I think it evident that the small-pox here hath grown far more mild and manageable than formerly, under similar treatment.

ARTICLE V.

REMARKS *on the* EFFICACY *of the* EXTRACT *of* HEMLOCK *in the* CURE *of* TETTERS, *and particularly in the* CURE *of an inveterate* DISEASE *of the* BLADDER. *By* LOUIS VALENTIN, *M. D. late Physician of the French Forces in St. Domingo. Communicated by Professor* BARTON, *of Philadelphia.*

M. DAVID, an inhabitant of Cape-François, seventy-seven years of age, was tormented, for more than three years, by a strangury, for which he had taken the advice of many gentlemen of the faculty, and had used unsuccessfully a great variety of means, both internal and external; and finally bougies were introduced into the urethra. At length he called for my advice, about the latter part of the year 1791; and, amongst the exact accounts of his life, he observed that, twenty-eight years before that period, having been obliged to go to France, on account of an obstinate abdominal dropsy, he abstained entirely from all kinds of drink during twenty-five days on board of the ship, eating only, for his sustenance, some dry food; that when he landed at Bordeaux his belly was very much lessened, and in a short time after the cure was completed without any medicine. Some time after his return to St. Domingo, at the quarter of Dondon, near Cape-François, where his estate was, the dropsy began again to appear; and, in a second voyage, he was thoroughly cured by a methodical treatment under a French physician; but he was very sorry to be obliged to confess that he had abstained from drinking water only fifteen days in his passage. Thereupon he concluded that, being able to do in some degree without substantial food, he was determined to take any advice that I should give him, in order to alleviate the severity of his sufferings.

M. David had almost always lived a regular life, and his blood had never been infected by the venereal disease. His constitution was dry and lean. Having examined his disorder,

I saw him making water by drops, with burning pain in the urethra, chiefly in the neck of the bladder; and, during one hour, by reiterated contractions and efforts, he never discharged but one, two or three spoonfuls of urine. He was afraid of drinking any more, lest it should disturb his rest, of which he had been so long deprived. No obstacle was in the canal, no tumour in the rectum intestinum, nor in the prostate gland. The hypogastric region was nearly in a natural state. A looseness now and then disturbed and weakened him much.

There might be two immediate causes suspected—a stone in the bladder, or a particular disease in the membranes of that organ. Having introduced a sound, and after exploring attentively, I discovered no extraneous body; but I could not turn about my sound in its cavity as in other men. I found every where by the end of the sound a resistance as in a pocket of leather. I thought that a catheter of elastic gum might be useful in order to let out the superabundance of water, which the bladder could not hold without the most acute pain. But it was impossible for the patient to endure the catheter even two hours, notwithstanding his extraordinary courage. The half baths, the emollient topics, and all drink or other lenient medicines whatever, had never relieved him but for a moment.

Amongst my inquiries about remote causes of an old disorder, I learned that he was subject to the erysipelas and tetters; and showing me his left leg, I perceived a great mark of a ring-worm upon the inside of it, which itched so extremely that it caused him to scratch off the skin. Instructed already, by experience, in the effects of the repulsion of some acrid humour from the skin, and even of the gout and rheumatism upon the *viæ urinariæ*, I was induced to believe that his bladder could be affected by nothing but the humour of the ring-worm; that the membranes of it were thickened and hardened, and the size of the cavity decreased considerably in proportion to the length of its pathological state; and therefore the patient could not delay to evacuate a small quantity of urine, the contact of which provoked an irritability already much increased.

I began the cure with two pukes of ipecacuanha root, as much on account of the lax as to excite a shake from the centre to the circumference. Afterwards I ordered the extract of hemlock, increasing every day the dose, with six, eight or ten grains: soon it was brought up to a drachm. Then I

continued the same weight more than a month, until he got rid of a great propensity to sleep (which he felt every day after dinner), and of some convulsive motions in his lips. The dose was after that increased to three drachms every day. I then perceived that the bladder kept in a great quantity of urine, and its extreme sensibility was much abated. However, an abounding excretion of spittle, with an inspissated mucosity, without any affection, either of the throat, the tonsils, gums, &c. was an inducement to diminish the dose for a short time.

Our patient drank also the juices of some of the depuratory herbs, but the diarrhœa coming on, he forsook them. I ordered to renew the dose, by degrees, to three drachms. He indured it perfectly well; and, in the sight of every body, he evacuated without interruption, and almost without any pain, a large tumbler full of urine. He felt that the bladder was more extended, and that he could contain his water a long time. He went from home with a design to take a walk, what he had not done for three years past, being obliged to stand every moment, in order to make a few drops of water.

The ring-worm of the leg and the itching appeared no more. I had fixed a cautery under the knee of the same side, but it never discharged any matter. All the irritating and stimulating topics on the tetter, though in a small quantity, brought their action into the bladder and the canal of the urethra. I forsook them to wash only the leg with the decoction of althea.

In fine, sleep and the other functions of that age (the appetite excepted) were restored, after the use of the hemlock, in one year. In computing exactly, in every particular, the quantity of that extract, we found that M. David had taken sixty-four ounces of it, or four pounds. (There are sixteen ounces in the French pound.)

Some time after this cure, an insurrection happened in the town, in which one party attacked another. M. David being quietly seated down at home, near the door, St. Simon's-street, was, by chance, struck in the breast, and killed immediately, by a gun-shot, which was designed not for him, but for a horseman who was escaping. I seized upon this occasion to open the dead body, and I called Dr. Baradat with a design to examine the bladder with me. We found it sound, smaller than in a natural state, and its membranes but a little thicker about the lower part.

REFLECTIONS *on the* EXTRACT *of* HEMLOCK *(Conium Maculatum.* Linn.)

We see, by the above observation, not only the good effects of this remedy, but also the strong dose which the patient has borne without inconvenience (the inodorous salivation being excepted), when three drachms every day were taken. I have always ordered strong doses of it, and it never produced that last effect. It might, perhaps, be said, that the extract of hemlock contained mercury; but it is wrong, for no experiments have given any proof on that subject. It was fresh and well chosen, and appeared to be very good, being procured from Messrs. *Saussay & Brus*, apothecaries at the Cape. The same remedy has never produced that effect in any other instance; having made a copious and successful use of it in the cure of obstinate tetters in the West-Indies, some time together, with the strained juices from herbs of a soapy and nitrous quality.

However, I have recently seen at Norfolk, in Virginia, a person to whom I prescribed the extract of hemlock, by degrees to one drachm *per diem*, casting up a great deal of spittle, afflicted with a sore throat, sore gums, tonsils, &c. Gold, when rubbed with that medicament, would become white immediately, and I discovered easily the quick-silver. It was a mixture of Bellost's pills and a small quantity of extract.

Every physician knows how exceedingly the extract of hemlock has been praised by Dr. Storck for the cure of cancers; but numerous experiments have proved its insufficiency, not to say its inefficaciousness; and its virtues in those cruel diseases are now come to nothing, as well as the praises and boastings of its admirers. It is not the case as to the diseases of the skin, ulcers, and some oppilations issuing from them, and even sometimes from a venereal disease, after an unsatisfactory treatment with mercury. The climbing morel *(solanum scandens seu dulcamara)*, so celebrated by Dr. Carere, of Paris, and lastly by Dr. Otto, from Gotha;* the bark of the pyramidal elm, by Dr. Banau; the soap-wort *(saponaria officinalis)*, by Dr. Retz; the antimony of Jacquet; and a great many other chemical compositions, which, nevertheless, are not to be rejected, seem not to produce so good effects as the mere extract of hemlock, especially when its use is combined with a vegetable diet and exercise. All animal and

* Dissertatio Medica de Usu Medico Dulcamaræ. Printed at Jena.

greasy food, fit to increase or maintain the bilious plethora, ought to be interdicted; for the remote causes of those disorders exist undoubtedly in the organs of digestion, which have a great connection with the skin, but essentially in the liver. Therefore Galen says judiciously: "*Herpetes biliosus procreat succus.*"*

This remedy must have an excellent effect, taken in sufficient doses, and continued a long time. At St. Domingo I joined with it the cold bath; I repeated, from time to time, vomits with tartar-emetic, preferring often a drink with vinegar, sugar and water, to that of sarsaparilla decoction. Sweats are in those cases always salutary, but they must not be provoked with hot and acrid sudorifics. Among the five kinds of tetters with which we are acquainted, the *herpes pustulosa et squamosa*, and the *herpes viva et suppurans*, are there the most common; and often many people are cured by changing the climate only.

The desiccative and repelling ablutions and liniments are sometimes employed successfully, but it is only about the end of the treatment, and they must be prescribed cautiously.

Permit me to observe, that the alkali volatile fluid, and the sudorific syrups of mercury, which some surgeons of St. Domingo make use of, have frequently produced pernicious effects. Mercury is very noxious when there is not a venereal taint; and those ring-worms do not originate often from it, as is commonly believed.

ARTICLE VI.

MEDICAL HISTORY *of* BLOCK-ISLAND *for the Year succeeding the Autumn of* 1801. *By Dr.* AARON C. WILLEY.

BLOCK-ISLAND is an appendage to the State of Rhode-Island, lying in lat. 41 deg. 10 min. N. long. 71 deg. 40 min. W. from Greenwich, 21 miles S.S.W. from Newport, and 19. 5 E. by N. from Montauk-Point. Its aboriginal appellation is Manisses. "It was erected into a township, by the name of New-Shoreham, in 1672." A chain of large ponds extends from the north end to nearly the centre. These, with several other separate and smaller ones, compose about one-seventh of

* Gal. Meth. Med. lib. xiv. cap. 9.

the island. The land, in general, is high, and on the western part very uneven, being much diversified with precipitous hills and narrow dales. The eastern part is more disposed to gentle risings and descents. The soil is various; sandy, loamy, and argillaceous, with considerable quantities of peat. In the progress of rude cultivation it has become entirely destitute of trees, except now and then an old solitary memorial of its once beautiful groves. Fruit-trees find not here the nourishing care of man. Peat is the only fuel. The water made use of for drink, and the various processes of cookery, is taken from springs or ponds, and, for the most part, slightly impregnated with alumine, iron, and muriate of soda. The inhabitants consume an unusual quantity of ardent spirits, tea, snuff and tobacco.

Respecting the diseases of the island, from its earliest settlement to the invasion of the yellow fever in the summer of 1801, nothing satisfactory can be obtained. The facts pertaining to this subject have never employed the pen of genius; and, as to traditionary accounts, they are at all times vague and inconclusive. The yellow fever of last year I have treated of in a former dissertation. This was followed by a remarkably moderate winter, with but little snow. The ground was so free from congelation in January as to admit of being ploughed. The few febrile cases which occurred were of an inflammatory nature, and yielded to the depleting and antiphlogistic plan. In every instance traits of the late epidemic were highly conspicuous. The spring was wet and cool; vegetation backward. In March and April a catarrh was frequent among children. It was constantly attended with dyspnœa. May, June and July were wet and cool, except a few days in July. In this last month, the island, for a great part of the time, was enveloped with fog. No febrile complaint worthy of notice occurred till the 4th of August, when I was called upon to visit an unmarried female, of middle age. She was seized with a violent pain in the fore part of her head—pain and soreness of the eyes, accompanied with a defluxion of humours—pain in the back and bones—soreness of the flesh—lassitude—dry skin—thirst—anorexia—tongue moist, and covered with a brown fur—rigors, succeeded by flushes of heat, and full, frequent pulse. I let blood, and administered a dose of calomel and jalap. This, with some febrifuge preparations, arrested her disorder, and in a few days she was well.

The same day a lad, aged fourteen years, was attacked in

a similar manner. I let blood, and administered drastic purges, but in vain. His disorder was obstinate, and progressed with unabated violence. Dyspnœa and delirium soon acceded, and he died in a state of stupor on the eighth day of his malady. Two more of the same family were seized with the first symptoms of this fever; but, by an early use of venesection and active cathartics, they soon recovered.

August 14th I was called upon to visit a girl of about 14. She was in the third day of her fever. I found her with pain in the head, back, &c.—vertigo—nausea—perverted taste—dry skin—aversion to light—tongue moist and brown—pulse full, but not frequent, dejection of spirits, &c. I let blood, and exhibited calomel and jalap. This increased the frequency of the pulse, and rendered the febrile affections more distinct. On the 16th there occurred pains in the stomach, oppression, diaphoresis, yellow tongue, costiveness, and singultus. The pain was alleviated by camphorated tincture of opium, and costiveness removed by sulphate of soda. The other symptoms gradually subsided. Convalescence was attended with a yellowness of the skin.

The weather continued humid and cool for the season, with less fog.

From the middle to the last of this month, cases of cholera, attended with an unusual degree of pain, were frequently occurring. These were treated by exhibiting opium in quantity sufficient to mitigate the pain, quieting the stomach by antiemetics; after which calomel was given to deterge the primæ viæ, and promote the action of the absorbent system.

On the 29th I was requested to visit a married woman, aged 24, of gross habit and robust constitution. She complained of violent pain in the anterior and posterior part of the head—pain in the eyes, thoracic region, stomach, back, and bones—vertigo—intolerance of light—languor—lassitude—nausea, and ejection of green bile—thirst—great heat, and diaphoresis. Her tongue was moist and white; pulse strong and frequent. I employed blood-letting, and exhibited calomel and gamboge. The blood, when separated by standing, showed a large proportion of crassamentum settling to the bottom of the vessel in saffron-coloured serum. The medicine operated both as an emetic and cathartic, evacuating green and dark-coloured bile. The next day the pains were considerably abated; the pulse softer, but quick and frequent. The nausea and puking still continued. I put her upon the antiphlogistic plan, with columbo in substance, and the essential

oil of peppermint: but this not appearing to check the progress of her disorder; the pains beginning to increase, with the accession of yellow tongue, oppression in the region of the præcordia, burning in the stomach, paracusis imaginaria, and dry, starchy lips, I applied an emplastrum cantharidis between the shoulders, and administered calomel, in small and reiterated doses, till it affected the salivary glands. This was immediately followed by convalescence, and she was shortly able to walk about.

Numbers were invaded with the premonitory signs of this fever; but by early venesection, and an exhibition of calomel, the impending disorder was happily averted. Many of these were succeeded by diarrhœa. The most sovereign remedy for this was acetate of lead. It was given in honey or molasses, in doses from one grain and a half to four, every two or three hours, as the exigency of the case demanded.

September and October were cool, with the common portion of rain. No peculiar disorder occurred worth recording.

From the foregoing history of diseases I think we may safely make the following conclusions:

1. That these cases of fever were of the same nature as the yellow fever of last year.

2. That the fever, cholera, and diarrhœa, arise from the same causes.

The causes of malignant and epidemic disorders, exclusive of the proximate, may properly be considered as *remote*, *predisposing*, and *exciting*. The *remote* consists in a morbid constitution of the atmosphere; the *predisposing* in a diathesis, or peculiar condition of the animal system; and the *exciting* is that principle which, by contact with excitable parts, produces diseased commotion, or a vitiated derangement of the functions. Different causes have been too generally assigned for different disorders, and for different appearances of the same generic disorder. This is an error—an error which has prevailed from the earliest ages of medicine, and which still holds its empire in the minds of a great proportion of our physicians. Nature ever delights in simplicity. Her agents are not so multifarious as erring man is apt to imagine. This is highly conspicuous in the production of those maladies to which we now advert. Pestilential, intestinal, and, perhaps, many other diseases, with all their various aspects and grades, are, in general, owing to the extensive operation of the same morbid powers. But the number of these are extremely circumscribed. The most potent, durable, and widely

different, is the *remote*, or Sydenhamian constitution of the air. In what this consists, is, perhaps, difficult to explain. Some have supposed it to be a superabundance of the hydrogenous, others of the oxygenous portion of the atmosphere; while others, with more plausibility, have conjectured it to be a modification of electron. I am rather inclined to conclude that it is an occult principle, operating in a manner *sui generis*—a principle hitherto eluding the assiduity of philosophical research, the developement of which will one day form a brilliant æra in the annals of science, and immortalize the memory of a second FRANKLIN. The subject, however, affords a spacious field for the inquiring mind to explore.

The *predisposing cause* is commonly the effect of a combination of active agents and contingences. The leading and most influential is the *remote* already noticed. This, in co-operation with the sensible qualities of the air, and in connection with the manner of living, the primordial structure and motive evolutions of animal organization, produces the peculiar diathesis favourable to the action of exciting powers.

The *exciting cause* is septon, oxygen and caloric, chemically united, and constituting septic acid. This is spontaneously generated two ways—by electrical agency, and by the process of putrefaction. The first seldom produces it in sufficient quantity to induce febrile affections. It is formed by putrefaction in the intestinal canal, and upon the surface of the earth. The former is commonly the exciter of solitary cases of fever, which so frequently occur; the latter of endemic. To trace the mode in which the acid of septon is formed, the circumstances which favour its generation in the first passages, its various states, and manner of disordering the economy of living bodies, is not the design of the present essay. The object of these brief remarks is only to illustrate the doctrines which they embrace, by showing their connection with incontestible fact.

It is presumable, and with the highest probability, that those febrile diseases which occurred the last summer were owing to the same causes as the epidemic of 1802; viz. a morbid constitution of the atmosphere, continuing, "under all the circumstances of wet and dry, of hot and cold weather," a synochal diathesis of the animal system, and the insalubrious acid of putrefaction. Had the septic vapour prevailed this last season as in the former, the fever would have raged with equal malignancy. But the generation of this deleterious gas was impeded by an excess of moisture, and a want of a com-

petent degree of heat. But it was formed, however, in sufficiency to excite its noxious power on those who respired the air in which it was diffused.

The fever, cholera, and diarrhœa, were evidently the production of the same causes, acting upon different parts of the system, and with different degrees of violence. The circumstances of their co-existence, and of their quick succession in the same person, tend greatly to confirm this opinion.

The two last summers have here exhibited instances of the domestic origin of malignant disorders. Not the least appearance of their importation can be found, while their indigenous source can be easily traced. Indeed, the doctrine of imported contagion is *mostly passing away*. A few years more, and it will be known only by the page of history.

Block-Island, Nov. 12, 1802.

ARTICLE VII.

A CASE *of* TRISMUS *cured by* LAUDANUM. *By* RICHARD HAZELTINE. *Communicated by Dr.* D. HOSACK.

SUNDAY evening, December 6th, 1801, I was called to visit Capt. T. L. of Sanford. About two weeks before, he had received a small wound directly on the last joint of the thumb of the right hand. The wound was so small, and seemed so trifling, that he took little or no notice of it till Thursday evening, December 3d. It had nearly healed, when, on Wednesday, December 2d, he accidentally hurt it, and tore it open. Thursday evening it became painful, and continued so on Friday—the pain extending up the arm; and on Saturday it affected his jaw. Saturday evening he was suddenly seized with stiffness in his limbs and body, and in the muscles of his jaw. He also felt a pain in the œsophagus, and some disagreeable sensation in the act of deglutition. A mild bilious diarrhœa came on at the same time, attended with some pain. The rigidity was so sudden and universal, that, being in an erect posture, he fell down on the floor, and was helped to the bed, Sunday, some time in the day, he felt a pain under the sternum, which extended to his back.

I found him as follows: His jaw was so set that it would barely admit a goose-quill: this had been the case twenty-four hours. His thumb was extremely tender and painful. He was

affected with pain in his limbs, accompanied with frequent convulsive twitchings, like subsultus tendinum; also with pain in his bowels, attended with loose, though not very frequent dejections, distress at his stomach, cool extremities, *weak*, *small* pulse, and *slower* than natural. The pain in his jaw was not constant, but the rigidity was without intermission.

He was a person of a bilious temperament, and had often been troubled with paroxysms of bilious colic. He had enjoyed little or no sleep during the last twenty-four hours, had felt no appetite for food, and had taken none, of consequence, for several days. The circumstances of his family, for several months past, had been such, that he had experienced not a little bodily fatigue and mental anxiety, as well as occasional indisposition and ill health.

Before this I had *seen* but *two* cases of tetanic affection; one of which, as it came under my care (in 1798), I recorded, and communicated to a gentleman of the Medical Society of this commonwealth: the other occurred in this town in September last, and came under the care of others of the faculty. Both cases proved fatal. My studies and my reflections, in the course of my practice, had frequently turned on the nature of tetanic complaints; and I had adopted a theory, respecting the propriety of which I felt somewhat confident. My reflections had been such, that in this case I did not hesitate a moment what plan to pursue. It appeared very clearly to be owing to debility in every part of the body, without preternatural excitement, except in the muscular system, and without plethora. In such a case I presumed opium would certainly prove efficacious and curative, if given in sufficient quantity; and I would admit no limitation in the use of it till it should produce a relaxation of the spasms. This was the criterion, in my mind, by which to judge when I had given enough: this was the boundary-line in my view; and I was determined to exhibit opium (or laud. liq.) till that effect was produced, *i. e.* till I had obtained a complete relaxation of all spasm or convulsion, or, in other words, till the opium had induced *ease* and *sleep*.

I began with sixty drops of liquid laudanum at 12 o'clock at night, and repeated that dose every hour. My laudanum, in that dose, was equal, I am confident, to not less than two grains of solid opium. I accompanied the laudanum with an infusion of valerian and Virginian snake-root, which I gave principally with a view to the disordered state of his stomach and bowels. After he had taken three doses of the lauda-

num, he opened his mouth so as to admit my finger, and I gave him two of the quicksilver pills of the Pharm. Ed. nov. I had given him seven doses of the laudanum, of sixty drops each, before sun-rise, and six of the mercurial pills. After taking the fifth dose of the laudanum, he said he could open his jaws as well as ever; but I rather doubted it; for I perceived, or rather suspected, that he made the declaration from the fear that I should give him more of the laudanum than would be safe: therefore I gave him the sixth and seventh doses before I left him, which was about sun-rise. When I left him, the medicines had completely removed his spasms, pain and uneasiness in every part of him, and he had been able to obtain some sleep. He said he felt relieved in every respect. Through the night I poulticed his thumb with bread and milk. I ordered him to apply the common plaster, to continue the poultice to the thumb, to use the laudanum as he might find necessary, and the pil. merc. so as to affect his mouth if possible, and to take some broth, &c. if he could.

Tuesday, December 8th, I found him comfortable. He had experienced no return of the spasm after I left him on Monday morning, except in the evening of that day, when it recurred, but readily yielded to a dose of the laudanum. I made little or no alteration in my former directions, excepting that I gave him a dose of rhubarb and calomel, in order to remove a pain which he still complained of in his bowels.

Thursday, December 10, I found him entirely free from spasm, which left him the evening before; since which he said he had constantly felt as if he had been disjointed in every part of him; he felt so weak and relaxed. He now spat freely: his pulse was regular and his heat natural. I left him more laudanum, and some occasional medicines, such as some laxative pills and bitters, and thought him out of danger if he was careful.

Ten or fourteen days afterwards he was so well that he rode on horse-back ten or a dozen miles to a relative's, where he was taken unwell, and threatened with a return of the spasms; but, by the seasonable use of some opium which he obtained from a physician in the place, the symptoms vanished. At this time the sore on the thumb broke out again, as it appeared not to have been healed from the bottom before; but, by the use of some common applications, it healed perfectly in a short time.

Berwick, Doughty's Falls, July 5, 1802.

ARTICLE VIII.

REMARKS *on the late Mr.* GEORGE LEE's *Account of a* MORBID DISSECTION; *Communicated to Dr.* MITCHILL *by an anonymous Correspondent.*

TO dispute an established custom, or advance a new theory, requires great ability, ingenuity, and, let me add, interest; however plausible the new adduced arguments may appear in the eyes of a few, whose minds are apt to change always with what last presents itself to their notice. But, Sir, it is no small advantage to society, that gentlemen of the faculty are more upon their guard than to listen to every supposed improvement in surgery, medicine, or anatomy.

In looking into the fourth volume of the Medical Repository, p. 138, I find a very ingenious and learned account of a dissection, written by Mr. George Lee. He asks, "If there was no absorption during the growth of bones, how could their cavities enlarge? and if new layers of bone were not formed on the external surfaces of them, how could they be extended?" I must beg leave to differ with that learned gentleman in opinion respecting the similarity of bone and wood: for we know, contrary to what he hath advanced, that the bones of an infant and the most mature adult are *alike* composed of an equal number of layers or tablets. We also know that the cavity always increases with the size of the bone; not as wood, whose outer layers, compressing, as they grow, more closely those within, not only prevent the enlargement of cavity, but, consequently, bring on a diminution, as we see plainly by cutting a tree, where we find in the younger or daughter branches large cavities, and in the larger or mother branches the cavities are considerably diminished in diameter; while the parent stock of the same tree is altogether without cavity, although formerly much excavated. The cavity of the trumpet, and other such trees, does, indeed, keep pace with the enlargement of the trunk; but we are to consider that they are composed of but one layer from first to last, and will rather serve to confute than elucidate his argument.

Mr. Lee mentions his having attended a woman who fractured the bones of both legs by only stepping obliquely upon the edges of bricks. Had he favoured his readers with the time of the year, or the particular state of the atmosphere when this happened, the information, I doubt not, would

have been more satisfactory. I remember being called to the assistance of a woman who had fractured the tibia by a false step on a very smooth pavement. One of the broken ends of the bone lacerated the adjacent muscles, and projected about an inch without the cutis. The bone was as thick as any I have ever seen. This happened in winter, in frosty weather —the time fractures are known to be so common. The woman, at the time, was young, and far advanced in pregnancy. She soon recovered, and in due time parturated, without any symptom for alarm. I have known other instances of fractures from a like cause, but the bone not appearing, their thicknesses could not be accurately known.

Mr. Lee's opinion on the absorbent system does not, I confess, agree altogether with my own; and I shall endeavour to account for the dissolution of bone in the animal machine in another way.

I, and I believe many others, know that diluted muriatic acid is capable of dissolving the bones of animals, while the muscular and other soft parts remain in perfect form, although corroded: and I am of opinion that, by a skilful management, the bones of a body may be thereby dissolved, and apparently obliterated; leaving the softer parts in an apparent state of symmetrical form, with a considerable degree of elasticity. This ossivorous acid reduces the bone to the consistence of tallow, granulated, and white. I therefore am led to suppose the substance found in the cavity of the abscess no other than the remains of bone. May we not, therefore, attribute this dissolution of bone to a sub-marine acid state of the contained matter, which, while it completely destroyed the ribs under the pectoralis major, and within the sphere of its own circumference, left the cartilaginous and other softer parts in a state nearly natural? From this a favourable prognosis may be inferred, for the guidance of the physician and surgeon, both as to the remedies proper to be employed, and also for the better making the requisite incision.

Although every surgeon cannot but be acquainted with the most proper mode of operating in such cases, yet it is proper for writers to be correct in their statements. I shall only quote Mr. Lee's own words, and close with my best wishes for the improvement of a profession founded on principles the most humane. "The tumour was opened twice by Dr. Physick, and discharged, at *both* times, five pints of glare." * * * * * * * * * * "He threw up from the lungs, before death, the same kind of matter which was discharged from the tumour by the *puncture*."

ARTICLE IX.

METHODS *of treating* HYDROPHOBIA *from the bite of* RABID ANIMALS, *extracted from German Authors: In a Letter from* JOHN G. KNAUFF, *M. D. to Dr.* MITCHILL, *dated Albany, January* 15, 1802.

HAVING read, in the Medical Repository, several statements of cases of *Hydrophobia Idiopathica sive Contagiosa*, and not finding in them the more effectual treatments recommended by modern writers, the effects of which have been sufficiently proved by many experiments made with them, I thought proper, notwithstanding my deficiency in the English language, to recommend the following extracts and translations to your readers, and to the public in general. For I consider it to be the duty of every individual to contribute all in his power to the prevention and cure of such a dreadful disease. The common methods of treatment are sufficiently known to be ineffectual.

The Rev. Muench* has published a short introduction of a new method of treating the bite of rabid animals, by the application of the *Belladonna (Atropa Belladonna Linnæi)*, or *Solanum Furiosum, Solanum Lethale*—Deadly Nightshade in English.

The directions how it is to be administered are in the following manner: The powder of the root *(Pulvis Radicis Belladonnæ)* is preferred to that of the leaves *(Folia Belladonnæ)* in the prevention and cure of the malady now under consideration. Two grains of the first are equal in strength to three and a half or four grains of the latter.

This medicine appears to operate chiefly by inducing perspiration. There are some persons who hardly ever can be brought to a perspiration, and with whom the belladonna, though taken in the strongest doses, has no effect in that way. With such persons it will commonly occasion a considerable swelling on the part infected with the poison. This swelling will appear principally with the first dose; with the second it diminishes; and with the third it entirely disappears. Sometimes a traction *(ein ziehen)* will appear in the wounded part during

* See "Muench's Kurze Einleitung, wie die Belladonna sowohl by Menschen als Thieren im tollen Hundsbiss anzuwenden sey. Goettingen. 1783." Muench's short Introduction of the Application of the Belladonna in the Bite of a Mad Dog on Men and Beasts. Goettingen. 1783.

the use of the *belladonna.* This traction must entirely cease before the medicine can be discontinued.

As soon as possible, after the person is bitten, a dose of the *pulv. rad. belladonnæ* is to be given internally; after 48 hours a second dose; and after 48 hours more a third. If, during the operation of the third dose, some swelling still appears on the wounded part—the traction therein has not entirely ceased —and the wound is not dry—a repetition of the belladonna, with five doses this time, is prescribed, after an interval of 72 hours, in order to give some time to the patient for recovery; to be administered every second day, like the first three doses.

Should it happen that the medicine operates too powerfully on the patient, so that he can not recover himself on the second day, a dose may be directed every third day; but this must not be done unless required by necessity.

The powder is to be taken with a little broth, or the like, when the patient is to go to bed, and the dose will operate. If a dryness in the mouth and throat appears, some cold water or milk may be taken; and if he is inclined to sleep, he may without molestation. On the following morning, if the powder has been taken in the evening, he may take some warm tea, and remain in bed some hours longer for the promotion of sweat.

Should the first dose occasion a *diarrhœa*, the second is not to be administered until that ceases. If a weakness of the eyes appear, or a *diplopia*, they are not to be strained with reading, &c.

If the symptoms of *hydrophobia* appear, notwithstanding the use of the belladonna, or if it has not yet been administered, increased doses must be continued in case the first or second should not arrest those symptoms. The patient must be kept in bed, plenty of sweet-milk given him if he can yet swallow, and blood taken from the foot. If a perspiration succeeds the paroxysm will soon be at an end.

The dose must vary according to the age, constitution and disease* of the patient. A weakly person requires always a deduction of some grains from the ordinary dose. The following will precisely fix the dose for a strong and healthy person, of robust constitution; supposing the disease to be occasioned by the bite of a rabid animal.

* I think it necessary to mention, briefly, that the belladonna is recommended in several other diseases; in some of which, as *hysteria*, *mania*, *melancholia*, and *obstructions*, I have administered the *pulv. foliorum belladonnæ* several times, with good success. The dose of the *folia*, in such cases, is from two to five grains.

To a child one year old, one grain of the *pulv. rad. belladonnæ* is to be given in breast-milk, for the first dose; the second and third are to contain one grain and an half each. It may take the breast, during the operation of the medicine, as often as it pleases. At this period children will generally be red-coloured over the whole body. A child of two years of age requires two grains for a dose: of three years, the first dose two grains, the second and third from two and an half to three grains. From four to five years of age, the first dose two and an half grains, the second and third three, three and an half, and four grains. A child of six or seven years old, the first dose four grains, the second four and an half, and the third from five to five and an half grains. From eight to nine years, the first dose four and an half, the second and third from five to six grains. From ten to eleven years, the first dose five grains, the second five and an half, and the third six and an half. At the age of twelve or thirteen years, the first dose six, the second seven, and the third eight grains. From fourteen to sixteen, the first dose six and an half, the second seven and an half, and the third eight and an half grains. From the age of seventeen to fifty years, the first dose ten, the second twelve, and the third from thirteen to fourteen grains. Women generally a little less. From fifty to sixty, the first dose six, the second eight, and the third nine grains. From sixty to seventy, the first dose four or five, the second and third from six to seven grains. From seventy to eighty, the first dose three, the second and third four grains. For a woman who nurses a child, the first dose is three, the second four, and the third five grains.

But in order to be convinced that the above fixed doses are suitable to the age and constitution of the patient in every particular case, it is necessary to notice whether the first dose occasions a very profuse sweat, or whether that part, in case this sweat does not appear, to which the poison has been communicated, swells up very much. If the one or the other appears, it is only necessary to continue the above-mentioned increasing doses; but if this does not happen, they must be augmented. In general, the first dose has a stronger operation than the succeeding ones, notwithstanding their being increased, as above directed.

If the first dose operates so harshly that the patient does not fully recover on the following day, the second dose is not to be increased.

The *pulv. foliorum belladonnæ* has been administered with

the best success in the bite of the viper *(vipera)*. The dose is, in this case, for robust persons from sixteen to fifty years of age, from five grains, increased by degrees to nine, every twenty-four hours.

The method of Dr. Schmucker,* first Surgeon-General of the Prussian army, is now generally combined with the above, and has seldom failed of success in the prevention of *hydrophobia*, if applied in time: nay, even when the poison has begun to enter the blood, it has often proved successful. It is the following:

As soon as possible after the person is bitten, as also if the wound should be healed up and dry, or if, after some time, the first symptoms of the poison entering the blood should appear, the scar, or the wound, as the case may be, is to be deeply scarified, and the hæmorrhage promoted by the application of a *cucurbita sive ventosa;* after that, the *pulvis cantharidum* is to be rubbed into the wound, and upon that the *emplastrum vesicatorium*, according to the size of the wound, applied. The sore occasioned by the blister is to be kept open, and the suppuration promoted by a continual dressing with the *unguentum basilicum*, mixed with a fourth part of the *pulv. cantharid.* If the suppuration increases plentifully, the sore may be dressed, now and then, with the *ung. basil.* alone; and, from time to time, as circumstances may require, the *ulcer* is to be irritated with the *cantharides*, to promote and continue suppuration, during the term of eight weeks, or longer. Should pain and a considerable inflammation appear, an emollient cataplasm may be applied. A powder, consisting of *nitre* half a drachm, and *camphor* two grains, is to be administered internally, four times every day.

In a letter of Professor Mederer,† a new remedy for the prevention of *hydrophobia* is proposed. Its principal virtue, says the author, consists in its preventing the poison from entering the blood: and this is not improbable, as the virus remains in the wound for weeks, even months, without action, before it is absorbed. To accomplish this, the extirpation of the wound with the *knife*, or the *cauterium actuale*, is sufficient; but as this is not practicable on all parts, he recom-

* See "Schmucker's Chirurgische Wahrnehmungen, Zweyter theil, seite 544." Schmucker's Chirurgical Observations, Part ii. p. 544.

† Entitled, "Methodus facillima et certissima Homines et Animalia cuncta a Bestiis Rabiosis Admorsa conservandi, ne quoque in Rabiem deveniant. Friburgi. 1783."

mends an easy and certain remedy. It is a solution of thirty grains of *lapis causticus* in one pound of water.

The wound is to be washed with this solution several times in a day, after it has been enlarged and cleansed as long as the inflammation will permit. If an inflammation already exists, it must be subdued before the application of the solution. If the wound be closed, the *lapis causticus* is to be applied as a *cauterium potentiale;* and after the *eschar* is removed, the solution is to be used as above directed. If the wound is not very irritable, lint may be moistened with the same, and applied.

This remedy has been administered to a number of persons bitten, and always prevented the fatal consequences, as appears from the annexed testimony of magistrates. But it cannot be of any use after the appearance of hydrophobia.

It is particularly observed, that the *lapis causticus chirurgorum*, or the alkaline caustic prepared of pot-ash and quicklime, should be preferred; therefore it is probable the *causticum lunare*, or *lapis infernalis* (lunar caustic,) does not answer the same purpose, being a solution of silver in nitrous acid. This makes the infectious poison appear to be an acid.

In order to give a short specimen how such bitten persons are generally treated in Germany, and with what success, I will here insert the remarks of Dr. Thilenius on that head.

"I have directed," he says,* "those unfortunate persons to be treated according to the directions of Dr. Schmucker, with deep scarifications—the succeeding hæmorrhage promoted with the ablution of warm water—the *cantharides* applied to the wound—*camphor* administered internally, as also two or three times the *belladonna;* and they have *all* been secured against the melancholy consequences. The ulcers I have caused to continue from four to six weeks. And in this treatment I have more confidence than in the *belladonna*, *anagallis*, *mercurius*, *meloe majalis*, &c."

But, notwithstanding these authorities, I cannot forbear to mention, that these methods have also sometimes failed, according to other reports; so that none can boast of an infallible remedy, as is sometimes the case, and, by its failure, bring the same into disrepute: for, of what remedy or method in any disease can we boast as being infallible, without appearing in the character of quacks?

* In his "Medicinisch und Chirurgische Wahrnehmungen. Franckfurth am Mayn. 1789. Seite 249." Medical and Chirurgical Observations. Franckfort on the Maine. 1789. P. 249.

As to my own experience with this remedy, I have nothing material to offer. I was bitten, but so recently (five-and-twenty days since) that I am unable to make any conclusion. I applied the caustic as above directed. One case, however, of another venomous wound, came under my care, which I will briefly state.

I was called, about eight or nine years since, to a girl about six years of age, in the town of Troy, who was bitten in the ankle *(malleolus)* by a young rattle-snake; and, at the time I visited her first, the purple swelling was extended over the whole leg and thigh to the abdomen, with a high fever and some convulsions. I immediately applied the *emplastrum vesicatorium* over the whole ankle, just covering the two punctures occasioned by the two teeth at once, and directed camphor internally, which removed all the symptoms by degrees, within 48 hours, without the least bad consequence.

Before I close I will take the liberty to add some remarks. Several observations in the Medical Repository, which seem to be stated in order to prove a kindred nature between hydrophobia and malignant fever, because black-vomiting* and yellow skin† appeared at the close of the catastrophe, and were a symptom of the latter,‡ confirm rather the opinion of Professor Stoll,§ that the raging fever can, in the first case, combine with any other sporadic disease, and is then a compound, far from the first, being a kindred of the one with which it is combined. And, secondly, that it was a symptom of the yellow fever, proves nothing more than that hydrophobia is a symptom occasioned by different causes; as, according to the observations of Dr. Theden, it has been a symptom of *phlegmone:* but from hence that eminent physician was not inclined to consider or treat it as *hydrophobia contagiosa.*

On this occasion I cannot forbear to recommend to some of your correspondents a little more circumspection in their treatment of the literature of other nations, with which they are not thoroughly acquainted; and not, with self-conceit, repeat the exclamation,‖ "*We are more improved in modern researches!*" when the reverse can be proved.

* Medical Repository, vol. v. p. 75.
† Ibid. p. 77.
‡ Ibid. p. 79.
§ Ratio Medendi.
‖ In Med. Rep. vol. iv. p. 125, it is asserted that "the Dutch and the Germans still continue the practice of cupping and scarifying. We are more improved in modern researches," &c. To confute this assertion, I have, at present, neither room nor inclination.

REVIEW.

ART. I. *An Essay on the most eligible Construction of Ice-Houses: also, a Description of the newly invented Machine called the Refrigerator. By* Thomas Moore. 8vo. pp. 28. *Baltimore.* Bonsal & Niles. 1803.

A TREATISE on the *great error of American agriculture*, or shallow ploughing, which we reviewed in our fifth volume, p. 311, first made us acquainted with this sensible and practical economist. He has now turned his attention to another subject of great domestic convenience, and shown how the cold accumulated in frozen water during winter may be treasured up for summer's use. Mr. Moore does not, like many fashionable epicures, consider ice, in hot weather, as a mere article of luxury. Like a careful calculator of what is good and desirable, he views it as answering more valuable purposes. He has demonstrated that a receptacle for as much ice as almost any private family may want, can be made for an expense of twenty dollars or less. In such a magazine ten tons of congealed water may be stored during the winter, for the use of the ensuing hot season.

Mr. Moore has further proved, that the ice so treasured up may be turned to *profitable* account by the man of business. When taken from its repository, and put into his refrigerator, it cools butter so greatly as to add to its value in market. The writer has sold this refrigerated article to the inhabitants of Georgetown and Washington, in Maryland, at an advance of from 4d. to 5½d. the pound more than any other butter in market would bring. By this advance of price on butter alone, a farmer who has a large dairy in the neighbourhood of a market may soon receive money enough to pay for his ice-vault and his portable cooler. He may afterwards enjoy the profits of his improvement.

But the saving he makes is not confined to butter alone. By means of an ice-house the proprietor saves the *price of* salt on all the fresh butcher's meat, fowl and fish needed for his family, until the moment of cooking. There is no danger of sustaining any *loss by their becoming tainted or putrid* in excessive heats, for a week or longer. *Lamb*, *veal*, *fish*, and *all* similar articles of *small marketing*, may be nicely kept,

and carried to the place of sale, without risk of spoiling, by the same means. And, indeed, *fruits*, *milk*, *cream*, and all other kinds of *drinks*, *meats*, and *perishable things*, may be kept from rapid decay in like manner, whether intended for domestic accommodation or public sale. An ice-house may thus be considered as one of the substantial appendages of a well-managed farm; an improvement in which convenience, health and profit are admirably united.

But instead of relating the whole history ourselves, we shall give Mr. M. an opportunity of telling his story in his own way: and on this occasion we request our readers to listen to him, as he lays down the physical principles concerning the passage of anticrouon (heat) into and out of bodies, and of their solid and liquid states, particularly of water. (p.6.)

" Water is converted into ice at the temperature of 32 deg. of Fahrenheit's thermometer; and, as long as any water remains in contact with the ice, the temperature of the ice will remain nearly stationary; but when the water is all frozen, the ice will gradually give out its heat to the incumbent atmosphere, until it acquires the same temperature. Ice, exposed to an atmosphere at any temperature above 32 deg. or, if placed in contact with any substance above that degree of temperature, will, in either case, be melted. The temperature of the earth, a few feet below the surface, in this climate, is generally found to be between 50 and 55 deg. If, therefore, a pit be sunk in the earth, and filled with the coldest ice (which may sometimes be obtained as low as 10 deg. by removing it from the water, and exposing it to a very cold atmosphere), the consequence will be that the earth will give out heat to the ice until the temperature of the mass is raised to 32 deg. the process of melting will then commence, and continue to go on as long as ice remains. But this process will not be as rapid as those who are unacquainted with the subject might imagine. It would seem, that as melting ice is always found to be at the temperature of 32 deg. that after the mass becomes raised to that degree, the smallest addition of heat would immediately convert the whole into water; but this is not found to be the case; to prevent it, one of the many wonderful properties of matter interposes, and which only enables us to preserve ice at all. This is the difference between water and ice in their *capacities for heat*. As I would wish to be clearly understood by every class of readers, and as I may probably have occasion to repeat this term, it will, perhaps, be proper to give a definition of it. The capacity

for heat which a body is said to possess, is its propensity or power of imbibing and retaining a greater or lesser quantity of that fluid, and, at the same time, appear to be of the same temperature as a given standard, which may contain a much greater or smaller quantity. Thus, in the subject under consideration, the capacity of water for heat is greater than ice; it being found, by experiment, that ice, at the temperature of 32 deg. requires the addition of no less than 146 deg. of the same scale, or thereabouts, to reduce it to water. To elucidate the subject still further, let a pound of water at the freezing point (to wit, 32 deg.), and a pound of ice at the same temperature, be put in situations where they will both receive an equal quantity of heat: when the ice is all melted, it will be found that the water has acquired 146 degrees of heat, and, of course, will be at 178 deg. Or, take a pound of water at 178 deg. and a pound of ice at 32 deg. put them together and cover them in a fit vessel; the ice will be melted, and the mixture will be 32 deg. or very nearly.

"It appears, then, that ice at 10 deg. deposited in a pit as before mentioned, and being in this solid state capable of conducting heat, must receive a sufficient quantity to raise the whole mass 22 deg. before any will be melted. When the melting process commences, it will cease to be propagated to the internal parts, because all that is received at the surface will go to supply the increased capacity of the water; and this will be produced in direct proportion to the heat received; the whole quantity requisite to melt all the ice being just as much as would raise the temperature of the same weight of water 178 deg. The greater the quantity of ice, the longer it will be in melting, because there will be less surface in proportion to its weight; and experience has proved that the quantity may be so great as not to be at all melted, during a whole summer, in this situation.

"It seems, then, our whole business is to guard against the introduction of heat; and, in order to take effectual measures for this purpose, it is necessary to be acquainted with, and attend to, the following principles:—That heat is transmitted with more difficulty through some substances than others: that it passes through fluid mediums by transportation, or the interchange of particles; and not from one particle to another, as in solid bodies. The capacity of air for retaining moisture is greatly increased by heat. The power of air to conduct heat is increased more than four-fold by moisture. An unequal distribution of heat in fluids will always produce

currents or interchange of particles; in general, those of the highest temperature will rise to the surface. There is, however, an exception to this rule in water: between the temperatures of 40 and 32 deg. that fluid is more expanded than at temperatures a little higher; and, consequently, those particles which receive a small additional heat will descend. To this extraordinary property in water is to be ascribed some of the most wonderful phenomena in nature, but does not affect the subject under consideration. Substances which transmit heat freely, such as the metals, are called conductors of heat; and those through which it passes with difficulty, such as wool, fur, are called non-conductors; and they are called good or bad conductors, or non-conductors, agreeably to their degree of conducting power."

Having stated these fundamental considerations, Mr. M. proceeds to describe the faults which are found in ice-houses of the ordinary construction, thus: (p. 8.)

"The foregoing principles and laws of heat being understood, will enable us to detect the defects of ice-houses in common use. In the most improved kinds I have seen, the ice is enclosed in a case of plank, or logs, within the pit; an interstice being left between the sides of the case and the pit, which is commonly filled with straw; the ice reposing on a loose floor of plank or logs, raised a little above the bottom of the pit. Let us now suppose the case just filled with ice, defended from winds and sunshine, but no straw, or other non-conductor, either at the sides or on the top; how will it be affected as the weather becomes warm? The particles of air reposing on the upper surface of the ice will soon acquire the same temperature, and those above them, which are warmer, not being capable of parting with any portion of their heat to them, the first will quietly remain in their places, in consequence of their greater specific gravity; and, of course, very little of the ice will be melted at its upper surface. At the sides it will be differently affected: heat will be communicated from the earth to the particles of air in contact with the sides of the pit, and, being thereby rendered specifically lighter, they will, of course, begin to move slowly upwards: their places below will be filled by those which have not yet become rarefied; and these, settling down from the sides of the ice, will leave a vacancy towards the top. This will occasion the ascending particles to incline towards that vacancy, and, finally, to pass over; then parting with their acquired heat to the ice, become again condensed,

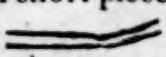
and in their turn descend. Thus a regular current will be established up the sides of the pit and down the sides of the ice; and by this transportation of heat a considerable portion of the ice will be melted. But as heat is much easier propagated upwards than in any other direction, it follows that a far greater quantity will be communicated to the under surface of the ice than to the sides, even if the stratum of air between it and the bottom of the pit were to remain dry. But it has been premised, that heat increases the capacity of air for moisture, and that moisture increases its power of transporting heat at least four-fold. The dripping from the ice will soon afford moisture in abundance; the particles of air at the bottom will always receive heat from the earth, and becoming at the same instant saturated with moisture, they will ascend with rapidity from every part of the bottom, communicate their contents to the ice, and descend with the same velocity to obtain a fresh supply; so that the quantity of ice melted at the sides will bear but a small proportion to the loss it will sustain at its under surface.

"From what has been said, it will easily be perceived, that this mode of insulating ice with atmospheric air is much to be preferred to filling the pit entirely with ice as first mentioned; because it cannot be supposed that air, which is only capable of conducting heat by means of the internal motion of its particles, even in the state most favourable for the purpose, can convey it from a warm to a colder body, with the same facility that it would be conveyed were the two bodies in actual contact. But experience has proved, that the conducting power of air may be much lessened by filling it with such non-conducting substances as will embarrass the particles in their passage: this is the use of straw between the ice and the sides of the pit, as now commonly used; but notwithstanding the waste of ice is abundantly greater at the bottom than at the sides, as we have just seen, yet I have not known similar precautions taken to prevent it. Indeed, it is questionable whether the same material, used in the same way, would answer any valuable purpose, because the water that would be continually dripping on it would, I believe, greatly lessen its power of resisting the passage of heat. There are, however, other non-conducting substances, which I think may be arranged in such a manner as greatly to prevent the loss sustained at the bottom of the ice."

Mr. M. then goes on to detail the result of his own knowledge and experience, in the arrangement of a suitable repository for ice. This he performs in an answer to the following query.

"*What is the most eligible construction for an Ice-house?*

"I will not undertake to say I am fully prepared to answer this question; although I am persuaded that the foregoing statement of the principles on which it depends is correct, and the observations founded thereon are corroborated by experiment as far as I have had an opportunity of attending thereto. Yet I have no doubt but further experience will suggest to intelligent observers, improvements which do not now occur. I will however offer a plan the most simple and cheap that I have yet thought of, consistent with the principles laid down.

"The most favourable situation is a north hill side near the top. On such a site open a pit twelve feet square at top, ten at bottom, and eight or nine feet deep: Logs may be laid round the top at the beginning, and the earth dug out, raised behind them so as to make a part of the depth of the pit. A drain should be made at one corner, the spout to carry off the water should descend from the pit, except a short piece at the outward extremity, which ought to rise thus  ; the depressed part will always stand full of water, and prevent communication with the external air. Dig holes in the bottom of the pit, and set therein four perpendicular corner posts, and an intermediate one on each side; let the insides of these posts form a square of eight feet in the middle of the pit. Then, in order to avoid dampness from below, cover the bottom three or four inches deep with dry sand, if it can be conveniently got. The next thing to be done I consider as the most material, and also expensive part of the business; which is fixing a proper floor for the ice to rest on. In order to do this, let three or four sleepers, supported at the ends, be placed across the square included by the posts; their upper edges about a foot from the bottom, but so that the plank laid thereon may have a descent of a few inches towards one of the sides next the drain. The plank should be two inches thick and about half seasoned; jointed, grooved and tongued, or lathed and grooves cut near the joints, in the upper side, so as to prevent any water from going through. The floor must extend a little without the inner sides of the posts, so that the water dripping from the sides may fall on the floor. Then fix a plank, or spout, at the lower end of the floor in such a manner as to convey the water into the drain. The floor being completed, begin at the bottom, and plank up on the insides of the posts with $\frac{3}{4}$ or $\frac{5}{8}$ plank, lapping the lower edge of each a little on the one below, so that the water may be kept on the inside: this done to the top of the posts (which should be even with the top of the pit), and the inside will be

completed; except that it will be proper to cover the floor with loose plank previous to putting in the ice. The roof may be composed of any materials, and in any form that will defend the contents of the pit from wet, from the direct rays of the sun, and also admit a free circulation of air: I do not think any could answer the purpose better than one made of thatch, supported by posts a few feet from the ground.

"The mode of filling the house remains now to be considered; and on this much depends.

"Early in the winter fill the interstice between the ice chamber and the bank with clean dry straw closely pressed; this being done early, will prevent the earth from freezing, which would be injurious to the sides of the pit. The ice should be collected in the coldest weather; let it be exposed at least one night to the cold atmosphere after it is removed from the water, which will reduce its temperature many degrees, if the weather is severe. When put into the house, it should be beat small, and I think it would be useful frequently to sprinkle it with a watering pot whilst putting in; the mass would by that means be rendered more compact. When the chamber is filled, cover the whole with a good thickness of straw; but I should suppose it would be best to cover the ice first with plank, supported by the sides of the chamber, only leaving a door to descend through.

"Such a house as has been described will contain about ten ton, and I am persuaded will be found sufficient to afford an ample supply for almost any private family.

"This is nearly the kind I had in view when I estimated the expense would not exceed twenty dollars; and if we calculate on a great part of the business being done by the family, which in the country in general it very well may, the actual out-lay, in many places, need not be five dollars. Those who are less sparing of expence, if they choose, may wall, or what is better, plank up the sides of the pit, and finish the roof in a style of elegance.

"In level situations, where a drain cannot be conveniently dug out from the bottom of the pit; I should suppose it would answer very well to enclose the ice by a mound raised entirely above the surface of the earth, through which the water may be discharged; in other respects to be similar to the foregoing description. This perhaps would not be quite so cool a repository as if under the surface of the earth, unless the mound was very thick; but I am persuaded that the loss of a few degrees in temperature bears very little proportion to the advantage resulting from dryness.

"If it were certain the floor would be perfectly tight, the passage of heat to the ice would be rendered still more difficult by confining a quantity of dry ashes, saw-dust, straw, or some other non-conductor between the floor and the bottom of the pit."

The reader is now acquainted with the method proposed for making a *magazine of cold*. The next object of the author is to transport ice to any amount that may be required, within a portable chest, to market, in contact with the butter, meat, or any thing intended to be presented there in a refrigerated state, and thereby sold for an advance of price. The author's experience and advice on this head are contained in the following extract:

"I knew that if a tight vessel, composed of some good conducting substance, was surrounded on all sides with ice, that the heat of its contents, whatever they were, would pass rapidly through its sides to the ice, until either the ice was all melted or the vessel and its contents were reduced to the same temperature; but then, while this process was going on, the ice, if exposed in warm weather, would also receive large quantities of heat from the atmosphere; so that to preserve a vessel and its charge of contents in this situation, would require such a quantity of ice as to render it both troublesome and expensive; it therefore appeared necessary to contrive such a covering for the ice as would defend it as much as possible from any heat, except what was received from the thing intended to be cooled. In order to do this, and at the same time to have a vessel of a convenient shape, I had a cedar vessel made in the form of an oval tub, nearly as wide at bottom as top; in this was fitted as large a straight-sided tin vessel as it would contain, open at the top: This of course left interstices between the sides of the tin vessel and the wood, and also at the ends; these interstices were covered by an edging of tin, which was soldered to the upper edge of the tin vessel, and extended on to the upper edge of the wooden vessel, to which it was nailed (but this edging, which connected the two vessels at top, would have been better of wood.) Through this last was cut a hole about an inch and a half square on each side, for the purpose of putting in ice. Over the whole was fitted a wooden lid, fastened by a hinge on one side. A coat or case was then made for it, which consisted of coarse cloth lined with rabbit skins, the fur-side next the cloth and the pelt next to the wood. The coat was in two parts, for the convenience of raising the lid; the part attached to

the lid had an edging which hung down and covered the joint when shut.

"This being only an experiment, was made on a small scale; the tin vessel being only 14 inches long, six wide and 12 deep: It was used for carrying butter to market, and contained 22lb. Before the butter was put in, small lumps of ice were introduced through the holes into the open spaces left between the sides of the two vessels; the butter, weighed off in pounds, by a peculiar and very expeditious mode of printing, was formed into the shape of bricks, with a device and initial letters in cypher on one side; these being wrapt separately in linen cloths as usual, were put in edgewise: The first tier always became so hard in a few minutes, that the remainder might be built upon it without injuring the shape. When all was in, pieces of cloth were laid over the holes made for putting in the ice, and the lid shut down and fastened. In this condition it was put into a carriage and carried twenty miles to market: but because there was always butter put up in the usual way, and other things to take at the same time, it was carried in the night; had it not have been for this circumstance, there would have been no occasion for going in the night. The butter in the hottest weather was always delivered so hard, that it was difficult to make any impression on it with the finger. Sometimes, after having been exposed in market, and frequently opened, when all was sold out, it has been again filled with other butter so soft as scarcely to admit handling, which, in a little time, has been taken out nearly as hard as the other; and after this, ice has remained in the machine most of the day. When the ice is melted, the water is drawn off at the bottom, or poured out at one of the openings in the top.

"The quantity of ice made use of in these experiments was not fully ascertained; but was proved to be at least twice as much as would have answered the purpose, had the spaces left for it have been only half as large. The whole cost of this machine was about four dollars: The butter always commanded from 4d. to 5d$\frac{1}{2}$ per lb. higher price than any other butter in market; so that four times using it paid the cost.

"In this machine, the heat passes freely from the butter through the tin (which is a good conductor) to the ice, and the ice being surrounded by several good non-conductors, it can receive but little in any other way. The non-conductors are first, the cloth; secondly, the fur on the rabbit skins; thirdly, the thin sheet of air confined between the pelts and the wood; and, fourthly, the wood itself. Yet through all these, a small

quantity of heat will find its way, which we are to expect will be the case in any arrangement that can be made, but with proper care the quantity will be so small that its effects may be easily overcome.

"The following are some of the useful purposes to which the machine may be applied, besides the one already mentioned. Every housekeeper may have one in his cellar, in which, by the daily use of a few pounds of ice, fresh provisions may be preserved, butter hardened, milk, or any other liquid preserved at any desired temperature: small handsome ones may be constructed for table use, in which liquids, or any kind of provisions, may be rendered agreeable, as far as it is possible for cooling to have that effect. Butchers, or dealers in fresh provisions, may, in one of these machines, preserve their unsold meat without salting, with as much certainty as in cold weather; and I have no doubt, but by the use of them, fresh fish may be brought from any part of the Chesapeake Bay, in the hottest weather, and delivered at Baltimore market in as good condition as in the winter season. But for some of these purposes, and perhaps for all, it will be found eligible to alter the arrangement of materials, and also to make use of some other kinds; particularly for those which are large, and are not intended to be often removed.

"After constructing and using the refrigerator which has been described, as its usefulness depended entirely on a supply of ice, I was naturally led to reflect on the most economical means of preserving it, and hence the foregoing investigation of the subject. In the course of that investigation an improvement in the refrigerator occurred. I clearly discovered, that agreeably to the laws of heat, any refrigerating body, placed in the upper part of a chamber defended from external heat, would certainly receive heat from the atmosphere of the chamber, until a common temperature was produced. I therefore concluded, that if a small tin vessel was attached to the under side of the lid of the refrigerator, to contain the ice only, and the lid made to slide instead of raising up, that the large tin vessel might be spared; which would certainly be a great improvement, especially as in that case there would be no absolute necessity for the wooden vessel to be water tight, and some difficulty attends keeping any other than a hooped vessel in that condition. In order to prove by experiment as far as I had convenience for doing it, I removed the tin vessel from the refrigerator, and placed a vessel containing water, and another milk, on the bottom of the wooden vessel, one at each end; I

then fixed a pewter bason, containing ice and salt, as near the top as I could to admit the lid to shut over it. I found both water and milk began to freeze in about an hour; and by letting them remain some time longer, they were both frozen to the bottom; the temperature of the room about 55°. Having never before seen or heard of any liquid being frozen by means of ice and salt in a temperature above the freezing point, in any other way than by placing the vessel containing the liquid intended to be frozen in contact with the mixture, this experiment, as far as it went, was encouraging. Some days afterwards, the temperature of the room the same, I fixed the bason containing ice only, as before, and made use of a thermometer to try the effect. I was now disappointed by finding that I could not by this means reduce the atmosphere within the vessel as low as the ice by 6 or 8°. But on a little reflection the cause was very plain. The non-conductors enclosing that portion of atmosphere, were not so perfect but they admitted some heat to pass through, and this continually mixing therewith, before it could be taken up by the ice, would of course always occasion a difference in temperature. This plan will not therefore answer the purpose as well as the other, either when a great degree of coldness is required, or when it is necessary to produce immediate effect. But for those on a large scale, such as would be proper to stand in cellars, or the holds of vessels, I think this last mentioned kind is to be preferred.

"The following I think would be an eligible mode of construction. Suppose it is required to have one whose contents shall be equal to six cubic feet clear of the ice vessel; let a box of wood be made three feet long, two feet wide, and sixteen inches deep in the clear; let another box be made of such dimensions that the first may stand within it, leaving an interstice between, on all sides, and also between their bottoms, of about an inch. The sides and one end of the outside box should also stand an inch or more above the other. Then put as much dry sifted ashes, or rather charcoal dust if it can be had, into the large box as will cover the bottom an inch deep; set the small box within the large one, leaving the space equal on all sides. Then prepare a lid, which may rest on the top of the inside box, after thin strips are nailed on the upper edges thereof, in order to cover the spaces left between the boxes; the edges of the lid confined by a ledge nailed to the outside box, or by a groove, and made to slide endwise: cut a hole of a convenient size near the middle of the lid for the purpose of putting in the ice, and connect a door to it by a hinge. The

ice vessel must then be fastened to the lid: this should be made of tin or sheet iron, about two feet long, eighteen inches wide, and four inches deep, having a convenient opening at one corner to draw off the water, which may be stopped with a cork: the side and end plates must be five inches wide, one inch of which must have a square turn outwards to admit of its being nailed up to the lid, which will form the top of the vessel. This being done it will be necessary to cut away one end of both boxes, so as to admit the lid with the ice vessel nailed to its under side to draw out. Then fill the space between the boxes at the sides and ends with the same material used between their bottoms; nail on the strips to confine it in, and the wood-work will be finished. The whole may then be covered with coarse blanketing, duffield, or the cloth called lion's-skin, so cut as to admit of the lid being drawn out, and to cover all the joints when shut: at the end cut down, to give room for the ice-vessel, it will be necessary to have a flap of several thicknesses of cloth, attached either to the end of the lid or box in such a manner as effectually to close the opening when the lid is pushed in.

"An easier method of fixing the lid (and perhaps in most cases ought to be adopted) would be, to let the top of both boxes be of equal height, and fasten the lid thereon, having an opening in the middle a little larger than the ice-vessel, through which it may hang down, suspended by the edges of its wooden top, to which it should be nailed as before directed, the joints to be all closed by the woollen covering. The only inconvenience that would attend this mode would be an increased difficulty in opening, on account of its having to be lifted off when full of ice; but this might in some measure be remedied by having suitable handles, and for those that are to be stationary a small pulley.

"Such an ice-vessel as has been described will probably contain about 30lb. of ice in lumps; and is capable of cooling more than 120lb. of any kind of provision or liquids, put in at the average summer temperature, down to 6 or 8° below the coldest spring water. I have not consulted any meteorological tables on the subject; but believe I am safe in stating the mean temperature of this climate, from the middle of the fifth month to the middle of the ninth month (which is about the time ice is useful) rather below 80°. It will then require any article at that temperature, to be cooled 30° to bring it to what was proposed. As it requires 146° or thereabouts of heat to convert ice to water, then, as many thirties as are contained in

146, so many pounds of the thing intended to be cooled will each pound of ice cool to the degree required, admitting the ice to receive no other accession of heat. For the sake of round numbers, instead of 146 we will say 140, which, divided by 30, quotes $4\frac{2}{3}$; 30 pounds of ice multiplied by $4\frac{2}{3}$ produces 140 pounds of the article to be cooled: if we strike off the fraction $\frac{2}{3}$, which will be just $\frac{1}{7}$ of the ice, on account of that portion of external heat which will find its way in while the articles are cooling, we shall then have 120lb. This is much more than almost any private family would have occasion to put in daily, for the use of the family only. There are, however, some deductions to make for the heat, which would be admitted by frequently opening, and also continually passing through the sides and bottom of the boxes.

"But it is impossible to calculate with certainty on the subject without more accurate experiments than I have yet made. I am however of the opinion, that the average quantity of 20lb. of ice per day will be sufficient in such a refrigerator as has been last described, to answer the purposes of a large family; even admitting that, with other things, the milk of two or three cows should be kept therein: when the weather is very warm, the necessary quantity will probably be greater, and proportionably less when cooler.

"When it is required to produce a great degree of cold suddenly, it will be proper to beat the ice small, and add about $\frac{1}{4}$ its weight of salt; the mixture will melt much sooner than ice alone; and because the freezing point of the brine their union will produce, is 38° below the freezing point of fresh water, and its capacity for heat being greatly increased on its passing to the fluid state, the mixture, while melting, must necessarily be abundantly colder than ice, which constant experience verifies. After the brine has taken up so much heat that it is no colder than ice, it may be drawn off and used for cattle, or any other necessary purpose. I should suppose this practice would be always proper for fishermen when their fish were first put in."

Considering the judicious and practical tendency of this publication, we heartily wish it might be generally read. If it should be extensively perused, we feel a confidence that it would influence many industrious and frugal cultivators to imitate the example, and follow the advice it contains. In the neighbourhood of the city of New-York such improvements would have the happiest effects. We should see butter in a firm and compact form, instead of the soft and half-melted

ice vessel must then be fastened to the lid: this should be made of tin or sheet iron, about two feet long, eighteen inches wide, and four inches deep, having a convenient opening at one corner to draw off the water, which may be stopped with a cork: the side and end plates must be five inches wide, one inch of which must have a square turn outwards to admit of its being nailed up to the lid, which will form the top of the vessel. This being done it will be necessary to cut away one end of both boxes, so as to admit the lid with the ice vessel nailed to its under side to draw out. Then fill the space between the boxes at the sides and ends with the same material used between their bottoms; nail on the strips to confine it in, and the wood-work will be finished. The whole may then be covered with coarse blanketing, duffield, or the cloth called lion's-skin, so cut as to admit of the lid being drawn out, and to cover all the joints when shut: at the end cut down, to give room for the ice-vessel, it will be necessary to have a flap of several thicknesses of cloth, attached either to the end of the lid or box in such a manner as effectually to close the opening when the lid is pushed in.

"An easier method of fixing the lid (and perhaps in most cases ought to be adopted) would be, to let the top of both boxes be of equal height, and fasten the lid thereon, having an opening in the middle a little larger than the ice-vessel, through which it may hang down, suspended by the edges of its wooden top, to which it should be nailed as before directed, the joints to be all closed by the woollen covering. The only inconvenience that would attend this mode would be an increased difficulty in opening, on account of its having to be lifted off when full of ice; but this might in some measure be remedied by having suitable handles, and for those that are to be stationary a small pulley.

"Such an ice-vessel as has been described will probably contain about 30lb. of ice in lumps; and is capable of cooling more than 120lb. of any kind of provision or liquids, put in at the average summer temperature, down to 6 or 8° below the coldest spring water. I have not consulted any meteorological tables on the subject; but believe I am safe in stating the mean temperature of this climate, from the middle of the fifth month to the middle of the ninth month (which is about the time ice is useful) rather below 80°. It will then require any article at that temperature, to be cooled 30° to bring it to what was proposed. As it requires 146° or thereabouts of heat to convert ice to water, then, as many thirties as are contained in

146, so many pounds of the thing intended to be cooled will each pound of ice cool to the degree required, admitting the ice to receive no other accession of heat. For the sake of round numbers, instead of 146 we will say 140, which, divided by 30, quotes $4\frac{2}{3}$; 30 pounds of ice multiplied by $4\frac{2}{3}$ produces 140 pounds of the article to be cooled: if we strike off the fraction $\frac{2}{3}$, which will be just $\frac{1}{7}$ of the ice, on account of that portion of external heat which will find its way in while the articles are cooling, we shall then have 120lb. This is much more than almost any private family would have occasion to put in daily, for the use of the family only. There are, however, some deductions to make for the heat, which would be admitted by frequently opening, and also continually passing through the sides and bottom of the boxes.

"But it is impossible to calculate with certainty on the subject without more accurate experiments than I have yet made. I am however of the opinion, that the average quantity of 20lb. of ice per day will be sufficient in such a refrigerator as has been last described, to answer the purposes of a large family; even admitting that, with other things, the milk of two or three cows should be kept therein: when the weather is very warm, the necessary quantity will probably be greater, and proportionably less when cooler.

"When it is required to produce a great degree of cold suddenly, it will be proper to beat the ice small, and add about $\frac{1}{4}$ its weight of salt; the mixture will melt much sooner than ice alone; and because the freezing point of the brine their union will produce, is 38° below the freezing point of fresh water, and its capacity for heat being greatly increased on its passing to the fluid state, the mixture, while melting, must necessarily be abundantly colder than ice, which constant experience verifies. After the brine has taken up so much heat that it is no colder than ice, it may be drawn off and used for cattle, or any other necessary purpose. I should suppose this practice would be always proper for fishermen when their fish were first put in."

Considering the judicious and practical tendency of this publication, we heartily wish it might be generally read. If it should be extensively perused, we feel a confidence that it would influence many industrious and frugal cultivators to imitate the example, and follow the advice it contains. In the neighbourhood of the city of New-York such improvements would have the happiest effects. We should see butter in a firm and compact form, instead of the soft and half-melted

state in which it is now sold: vast quantities of meat and fish might be saved which are now thrown away: much stench, corruption and disease would be prevented, and an additional neatness and elegance be given to all this branch of business. When it is recollected that an *ice-house* costs no more than 20 dollars, a *refrigeratory* but *four*, and the ice itself nothing more than the labour of collecting, we earnestly demand what can be the cause of the sloth and supineness of our fellow-citizens on this subject?

ART. II. *A Prospect of exterminating the Small-Pox, Part.* II. *Being a Continuation of a Narrative of Facts, concerning the Progress of the new Inoculation in America; together with practical Observations on the local Appearance, Symptoms, and Mode of treating the Variola Vaccina, or Kine Pock, &c. By* Benjamin Waterhouse, *M. D. Professor of the Theory and Practice of Medicine in the University of Cambridge.* 8vo. pp. 139. *Cambridge.* Hilliard. 1802.

OUR readers will remember that the first part of this publication was reviewed in our vol. iv. p. 176. It is well known to the public that the author was the first person in America who successfully imported and inoculated the vaccine disease. His exertions to introduce, disseminate and vindicate this inestimable substitute for the small-pox, give him a just and elevated distinction among those who have signalized their zeal in the cause of humanity. He seems to have perceived, at his first glance of the discovery, all the important consequences which were likely to result from it, and to have devoted his time and attention to the object with a degree of diligence which eminently deserves the thanks of the community.

We believe no improvement in the practice of physic, of any great importance, was ever adopted by the community with so much readiness as the vaccine inoculation. Yet this too has had no small share of opposition and prejudice to encounter. It is melancholy to reflect how slow and difficult we find the progress of every effort to diminish human misery, especially when it opposes established habits, and is introduced under the character of innovation. If such obstacles impede the course of discoveries which are attended by all the advantages of demonstrative evidence, what can be expected of

others, which, though equally well founded and important, do not possess the same force of conviction? The benefactors of mankind undergo more labour in obtaining a favourable hearing for their plans of improvement than in all the researches employed in ascertaining and maturing them. It would seem incredible to the inexperienced observer, that the best attested means of averting evil should require so much exertion, patience and perseverance, so much address and management, to persuade the community to receive them even for the purposes of experiment. Yet this is generally the fate of the first endeavours to induce men to accept a deliverance from their most pressing calamities.

We are drawn into these remarks by the recital which the author presents of the embarrassment he underwent in diffusing the new inoculation; partly by the coldness and indifference, partly by the mistakes and inattention, and, in no small degree, by the indirect opposition which took place among those who ought to have been the friends and protectors of the improvement.

It ought likewise, in justice, to be observed, that the details of this pamphlet make honourable mention of many individuals, who, with distinguished alacrity and zeal, stepped forward to support this discovery, and to lend it the whole weight of their influence. By the assistance and encouragement of these the author seems to have been animated to pursue his course with unabated zeal.

Besides the difficulties already noticed, Dr. W. had one to contend with arising from climate; and as this will probably be permanent in our country, and does not seem to be yet sufficiently known, we judge it proper to lay before the reader an account of it in his own words.

"With a fresh supply of matter, then, I recommenced my inoculation in March, 1801, and have continued it with undeviating success to the present time, two short periods excepted. The first interruption in the continuity of my cases happened in the month of July, when the weather was extremely hot, and when I trusted to the infected thread, instead of the fluid warm from the pustule. This accident led to the knowledge of a fact of some importance, and which I suspect is not generally known to those who practise the vaccine inoculation, even in England. It has been sufficiently proved, that in moderate weather, when the mercury ranged between 40 and 70° of Fahrenheit's thermometer, the vaccine virus has retained its activity three months, and even longer. But I found, last sum-

mer, that perfectly active virus, taken on cotton thread, from cases every way satisfactory (proved so by their recent fluid communicating the disease in perfection), will lose its virtue, when exposed ten or twelve hours, and even less, to 95 or 96° of Fahrenheit's scale. It appears that in such a temperature the virus or vaccine *aura* evaporates. Ever since March, 1801, I have inoculated more or less almost every day, and have scarcely experienced a single disappointment when I took the limpid fluid warm from the pustule; and but few instances of failure when I had recourse to the infected *thread*.* But during the very hot and very dry weather in July, the thread has failed in almost every instance.

"You will see by the abstract from the Meteorological Register, kept in this University by Mr. Webber, Professor of Experimental Philosophy, that the mercury rose almost every day for a fortnight to about 90, sometimes 96, and once to 97 degrees in the shade, and that the hygrometer pointed at 40 and even to 39°.† That this great degree of heat was accompanied with an extraordinary dryness in the atmosphere, which was noticed by our hay-makers, there being scarcely the appearance of dew at sun-rise for nearly a week. Finding these failures in the use of the thread, I was led to investigate the cause, and am now satisfied, that it arose from the dryness which reigned for two or three weeks at this season.

"If a thread, dipped in the oil of lavender, lose its fragrance by an exposure for several hours to the degree of heat just mentioned, can we wonder that the more subtle AURA *vaccina* should in like manner evaporate, and the virus become effete? What tended to confirm me in this opinion was a passage in one of Dr. Jenner's letters, received last year. It is this: 'I shall just say a word in proof of the *extreme delicacy* of the nature of the vaccine fluid, to shew how easily it may be disorganized. In the early part of my practice, I used frequently to evaporate the fluid by the fire upon *threads*, *glass*, or *lancets*, yet with much caution respecting the degree of heat; but experience has taught me, that even this procedure frequently occasioned an unnatural deviation from its perfect state, and a failure in communicating the disease.'

"I hope not to be misunderstood. I can never desire more satisfactory cases of kine-pock (as it is universally denomi-

* "This is to be understood of patients susceptible of the disease; for I find some who appear totally insensible to the action of the virus.

† "The thermometer is Fahrenheit's, the hygrometer De Luc's. See Medical and Physical Journal, No. xxxii. p. 328.

nated in America), than have occurred at this warm season; but they were produced by the recent fluid, transferred from one patient to another; whereas thread, ever so well imbued with the fluid of these satisfactory cases, and kept for a week, has lost its virtue; being, as I conceive, evaporated and exsiccated by a series of hot and dry days. It is recorded, that when the *Harmattan* blows (which is a very hot and a very dry wind in Africa, when the backs of books crack open, and cabinet furniture flies to pieces) the small-pox could not be communicated by inoculation.* Is it probable the failure arose from this cause?

"As the mercury, if I mistake not, very rarely rises above 84° in Britain, the practitioners there could not have been led to these observations. I believe the mercury seldom rises higher than this in the open ocean in any climate. The vaccine virus, sent me from London and from Bath, has demonstrated that it will *live* nearly four months."

After his account of the progress of the new inoculation in America, Dr. W. proceeds to deliver a number of practical observations on the cow-pock. This part of the work is divided into chapters; the first of which gives some historical sketches of the original discovery by Dr. Jenner, and of the commencement and progress of the disease on this side of the Atlantic. In the second chapter we find a concise and perspicuous account of the lymphatic or absorbent system, which is premised with the view of rendering the contents of the following chapters more easily understood. Chapter third treats of inflammation and its consequent secretion. Chapter fourth bears the title of *inoculation*, and exhibits a minute and correct account of the local and constitutional phenomena of the disease, from the time of the insertion of the virus to the completion of the course. In the fifth chapter the author states many important facts concerning spurious small-pox, a subject which has been far too much neglected, and seems, of consequence, not to be well understood. In chapter sixth, spurious cow-pock is treated of, and an interesting letter from Dr. Jenner on that subject is subjoined. Chapter seventh presents directions as to the mode of performing inoculation; and, in order to discuss this subject satisfactorily, the author describes the structure and functions of the cuticle, rete mucosum, skin, and adipose membrane. The *medical treatment* of the disease is delivered in the eighth chapter. And in the ninth and last

* Philosophical Transactions for 1781.

chapter Dr. W. inquires, without positively deciding the question, whether this prophylactic of the small-pox has been found in any quadruped in America? An appendix is subjoined, containing some brief biographical account of Dr. Jenner.

This pamphlet contains so large a portion of interesting practical matter, and comes from a gentleman of so much experience on this subject, that we doubt not our readers will be anxious to avail themselves of the perusal of the whole performance.

ART. III. *Strictures on Dr.* Grant's *Essay on Yellow Fever. By* Thomas Dancer, *M. D. London.* Murray & Highley. 12mo. pp. 35. 1802.

A PAMPHLET of between 60 and 70 pages, written at Jamaica, dedicated to the Duke of Clarence, and printed in London, gave rise to the piece now under consideration. The author, whose name is *Grant*, has thereby roused the critical spirit and professional ardour of Dr. Dancer. This acuteness and warmth are not exercised in Dr. G's favour; but in severe remarks upon the style and matter of his publication. It is easily discernible that its faults have not been noticed with the benignant look and gentle voice of friendship. They are treated with an austerity and harshness which bespeak a very different temper.

Of the personal relation and professional competition of these gentlemen, we know nothing; nor is it our desire to mingle in their disputes. To us, at a distance, there is neither temptation nor necessity to take a side either with Dr. G. or his formidable assailant. Our author appears to have examined the subject of his strictures with keen attention: not the attention, however, with which the eagle regards her young, but the attention with which she darts on her prey.

We hope Dr. G. will profit by the free remarks which his adversary has made upon his Essay. If he manages well he will prevent a repetition of them in the next edition. That writer is wise who avails himself of the observations of his foes as well as of his partizans; and, in the present case, it is easy for Dr. G. to disarm Dr. D. of the greater part of his strictures: and, in our opinion, this is the best and most exquisite satisfaction he can take for any injury he may suppose done to his reputation as a physician or a writer. In the mean time, we must acknowledge, that among many solid and valuable ob-

servations, there are not wanting traits in Dr. D's performance of censoriousness and hypercriticism.

But we would tread lightly on this ground: for as we have not seen the publication which has provoked the strictures, we own ourselves incompetent to pronounce clearly on the controversy. We gather, however, from the piece before us, that the principal subjects of dispute between those two West-Indian authors are very similar to such as exist in the United States among the members of the profession. Dr. Dancer is certain that a diagnostic difference exists between the *Endemic* yellow fever and the *Pestilential* yellow fever (p. 15). He is sure that yellow fever is *contagious* (p. 19). He is strongly opposed to *blood-letting* as a remedy for it (p. 33): and he is a zealous advocate of the treatment of it by *quicksilver* (p. 28). Hence we cannot be at a loss with whom to class him. Doctor Grant, it seems, is the reverse of all this. There can be no doubt then to what sect he belongs: but we shall not enlarge on subjects already often discussed by us; nor express in detailed terms the regret we feel that so valuable a correspondent, and so respectable a writer as Dr. D. should still be a contagionist.

ART. IV. *A certain Bar against the Approach of the Yellow Fever: written for the Good of the Public. By* Joseph Hamilton, &c. Hudson. pp. 22. 16mo. Stoddard. 1800.

POSITIVE language sometimes does great things with the multitude; but it does not always answer so well with reviewers. These audacious skeptics entertain doubts, after all they have seen and read, whether a *certain* preventative of that dreadful distemper is contained in the tiny publication now in their hands. Though it is not improbable that Dr. H. may have persuaded himself that the frequent recurrence of yellow fever since the year 1800, may be the consequence of the neglect with which his advice and prescriptions have been treated.

Dr. Hamilton promises a tract expressly on this disease: this we hope soon to see. In the mean time we gather from the present piece somewhat of his medical creed. He believes that putridity internally not only accompanies the yellow fever, but is the primary cause and bottom of it (p. 3). This exists both in the solids and fluids (ibid): and may be promoted by the peculiar states of the air, and other general causes, in any coun-

try or place: though it is impossible to determine exactly from premonitory signs, or the nicest examination, when it is likely to break out, or who are to be the first victims (p. 4). These opinions he carries so far, that he not only appears to be a non-contagionist, but he even goes further, and queries, whether an atmosphere contaminated by nastiness and putrefaction can be the efficient cause of the yellow fever? (p. 15).

Thinking thus that the disease almost wholly consists of morbid phenomena, induced by a dissolution "of continuity in the solids and fluids" from *internal* agents, or causes existing *within* the system, Dr. H. lays his principal stress on preventing its attack, by proper regulations of the stomach and bowels. For this purpose he recommends purging at first, and occasionally afterwards with cathartic salt, senna, rhubarb, calomel, or hepatic aloes. After which he directs a tincture of red Peruvian bark ℥ i. common snake-root ℥ ss. both in fine powder, good white wine lbij. to be taken into the empty stomach once or twice a day, to the amount of three or four spoonfuls at a dose; shaking up the materials well together. This is the medicinal course. As to the dietetic regimen, Dr. H. recommends the taking, in moderation, such drinks, whether vinous, spirituous, &c. as agree best with the constitution. He thinks the *fresh* flesh of land animals ought to be avoided as food (p. 8); and prefers the employment of it when cured with salt (p. 20). If fresh animal food is taken, he gives a preference to fish and aquatic creatures.

We should close our account of this performance here, were it not necessary to offer our protest against Dr. H.'s apology for uncleanness and corruption; for he roundly asserts the innoxiousness of the gases emitted by heaps of putrefying fish, both fresh and salted, scaly and shelled (p. 8). He says the efficient cause of the worst of plagues is not in dirty streets, nor in fens, ponds, nor swamps (p. 15). He declares that rotten and stinking cod-fish never give the men who catch them putrid fevers (p. 16); and that equal immunity attends the cutting up of corrupting whales. These seem to us monstrous and heterodox opinions, contradicted by the general evidence of facts, and deserving our reprehension and discountenance. Medical history, and indeed our own work, furnishes the contradiction and refutation of these assertions of Dr. H. in every particular.

ART. V. *A Physical Enquiry into the Origin and Causes of the Pestilential Fever. New-York.* Tiebout. 1798. 8vo. pp. 32.

IT may be said without jesting that this is the drollest publication we have ever read upon these afflicting distempers. The author proposes an hypothesis of his own for explaining their origin during the hot season.

But he does not gather his facts or data from books. Without troubling himself with researches into physical geography, practical medicine or experimental chemistry, he comes at once to the point, and states his opinion.

He takes it for granted that the ancient doctrine of the *four* elements is right, as far as it goes; but thinks *two* others ought to be added. One of these is *electrical fire*, and the other is an universal agent, which he calls *mother*.

Our readers will instantly ask what *mother* is? the author informs them that it is the great agent of vegetable and animal life, &c. that it differs essentially from air; that its native region is the surface of the earth; and that it does not descend deep into the earth but by compulsion; sometimes, however, it is forced very far downwards. But although it should nearly reach the centre of gravity, or descend to the bottom of the ocean, it will eventually make its escape and rise to its natural station upon the surface again.

Commonly *mother* rises pure: but it sometimes gets contaminated by combining with other things, especially during the putrefactive process, while the season of augmented heat prevails: then *mother* becomes vitiated and venomous. Thus transformed it rises from beneath, and, in its course upwards, defiles the earth and the water through which it passes. In its way, it creeps into houses, and invades their inhabitants, and makes great havock among the human species. And thus pestilential fevers are accounted for.

Reader, if thou demandest proofs of all this, and requirest us to place before thee conclusive evidence of such an high and serious discovery as a new element of wondrous activity, we must candidly own to thee, that if thou hast read the paragraphs we have written for thee, thou knowest full as much about the matter as ourselves. We have not the pleasure of the author's acquaintance: but when he shall give us a more complete *history of his mother*, we shall be glad to communicate it to thee; though we are apprehensive thou wilt chide us for dwelling too long upon *an old woman's story*.

ART. VI. *Quincy's Lexicon Physico-Medicum improved: or a Dictionary of the Terms employed in Medicine, and in such Departments of Chemistry, Natural Philosophy, Literature and the Arts, as are connected therewith: containing ample Explanations of the Etymology, Signification and Use of those Terms. From the eleventh London Edition, with many Amendments and Additions, expressive of Discoveries lately made in Europe and America. New-York.* T. & J. Swords. 8vo. pp. 646. 1802.

LEXICONS of the language subservient to common conversation and writing have been long ago compiled with great labour, and are acknowledged, by the critic, the scholar, and the man of plain understanding, to be of great utility. Such compilations are to be found in all the modern tongues which have been at all cultivated; and their number is rapidly increasing. They are catalogues of words, alphabetically arranged, and accompanied with the best information whence they were derived, and what is their signification.

It has been found that as men devote themselves to particular employments, and divide and sub-divide the occupations of life, that new facts are discovered, or new distinctions observed, which require new words to express them. These professional terms, though unnecessary to be understood by the greater part of mankind, are of singular importance to those who are engaged in the particular trade, calling or profession to which they belong. And in the progress of society, lists of the words peculiar to certain branches of business and of common words used therein with peculiar meanings, have repeatedly been made out and published. Thus for example, we have dictionaries of *Agriculture*, in which the rural cultivator may find the terms appropriated to that noble art, regularly arranged and explained. *Navigation* has its dictionary, which the seaman may consult for his better information concerning maritime affairs. *Music* also has its book of definitions. In short, *Chemistry*, *Law*, *Biography*, *Commerce* and *Botany* all have their dictionaries.

The profession of *Medicine*, which, taken in its liberal and whole extent, embraces an immense circle of literature, arts and sciences, has likewise been furnished with a number of similar works. Castelli, Blancard, James, Quincy, Motherby and Hooper are among the number of those who have published medical Lexicons. All these are respectable works, and possess their respective degrees of merit; but none of them seem

to have been so much in demand as that of the English physician John Quincy. A work published so long ago, which has gone through so many editions, and which almost every medical man among us has consulted a thousand times in the course of his studies, stands not in need of any recommendatory observations from us.

The publishers have given their reasons for re-printing *Quincy's Lexicon*, in a short prefatory dedication to the practical physicians and students of Medicine in America. This we offer to our readers.

" Although there are several Medical Dictionaries extant, yet there was a call for a new edition of the *Lexicon Physico-Medicum* of Dr. Quincy. His work was indeed first published many years ago, and has undergone various editions. And, in the mean time, Motherby's *Medical Dictionary*, and Hooper's work, under a similar title, have been offered to the public in England. It might thence be supposed, by some, that imported copies of these two books would supply the demand within the United States.

" The publishers weighed carefully this consideration. They reflected that the large folio volume of Motherby, though an excellent performance, was too bulky and expensive for the greater part of readers. And on examining the duodecimo production of Hooper, they found, that although it would not be subject to the objection of an high price, yet that it laboured under the disadvantage of being confined to subjects merely professional.

" In short, it was highly desirable that a book of definitions and explanations should be offered to medical gentlemen, which should be cheaper than the former, and more comprehensive than the latter of these dictionaries.

" There was no publication extant which approached so near this character as Quincy's Lexicon. Without costing the purchaser more than a very moderate price, it offers him a great variety of matter. In this edition some obsolete terms have been left out. There was little use in perpetuating words that were never employed by any writer of note or value in modern times. To retain great numbers of hard and uncouth names, which the present state of knowledge did not warrant or require, would be superfluous and disgusting, as well as perplexing to beginners. In these retrenchments, however, the reader may be assured not an article of worth has been omitted.

" In the place of the words left out on account of having

become antiquated and fallen into disuse, a very considerable number of *new* articles have been added. Some of these are names and definitions not in the original. Others are modern expositions of titles already in the work, but standing in need of correction, to adapt them to the existing state of practice and experiment. And in numberless places of this New-York copy, the pages have been cleared of the typographical and scientific errors which abounded in the London text."

On examining the volume now offered to the public, we find it to contain a great number of corrections, and nearly sixty articles, almost, if not entirely, new. Some of these are very important ones. As specimens of these, we extract the definitions of "Pot-ash" and "Yellow Fever."

"POTASH, potassa, or the common vegetable fixed alkali. It is a saline and concrete substance, not pre-existing in plants, nor formed during their putrefaction, but produced while they are turning to ashes in the fire. It is commonly classed among the simple and elementary bodies, but this is a mistake. Several ingredients enter into its constitution, but it is not certainly known what or which they are.

"A certain degree of heat only is requisite to the perfect formation and goodness of *potash*. If the fire is kept up too long, or too intense, the potash turns to a substance called *pearlash*, which is much weaker and milder. And by urging the heat more fiercely, and for a greater length of time, the alkali turns to what is termed *furnace-ashes*, which, though fair to the eye, possess very little strength and virtue.

"Fire thus can destroy potash, and according to its intensity and duration, can give it various degrees of excellence between the best and the worst sorts. Hence the various qualities of potash, pearlash, &c. known in the markets, and familiar to all artists and manufacturers. Chemists and men of science have latterly indulged miserable mistakes on these points, by affirming, first, that potash was an element; and, secondly, when pure, it was always one and the same invariable production. Now, neither of these assertions is true; for potash is a compound, and six samples of the article may be equally *pure*, and yet be very unlike each other. Independent of adulteration, or mixture with foreign ingredients, such as lime, salt, sand, gypsum, and the like, different parcels of clean and unmixed potash are daily found to vary very materially from one another.

"Potash has a very strong attraction for water. This it attracts from the air in such quantity as to dissolve itself. Such

spontaneous melting is called *delinquescence.* It combines also very powerfully with acids, forming neutral salts with the sulphuric, septic, muriatic, acetic, tartaric, carbonic, and other oxygenated bases. After these acids have been united to potash, they may be recovered by decomposition of the neutral salt. But they are always found to have undergone some alteration of their properties. There is no more instructive and beautiful example of this than is afforded by the *septic acid.* This offspring of putrefaction has been discovered to be a most active and venomous compound. Like other acids, septic acid can combine with potash. This neutral salt, formed from the acid of putrefaction, and the alkali of burned wood, is saltpetre, the principal ingredient of gunpowder. Septic acid, which is the great agent of human woe in *pestilence*, is quite as mischievous and destructive in *war.* The septic acid, though neutralized by potash, imparts to it qualities so noxious, that it can be safely swallowed only in small doses.

"When saltpetre is decomposed in close vessels, the septic acid is separated in a very new and altered form. Some action going on between it and the potash, materially changes the qualities of both, for the alkali is found, on examination, to be as much and as sensibly modified as the acid. Their union and their separation work great changes in both.

"The septic acid is thus changed in its constitution by the potash. It is further altered by the sulphuric and muriatic acids employed in the decomposition of the saltpetre, and further still by the high heat of the furnace. Exposed to so many causes of new modification and changes, the septic acid, on being disengaged from potash, assumes another name, and other properties. It is less venomous and active than it originally was, and goes by the name of the *nitrous acid.* Even then, it is the most powerful and corrosive of all the acids.

"Through want of attention to this distinction, great mistakes have arisen in chemistry. Some ignorant, and some dull persons have pretended that *nitrous* and *nitric* acids ought to possess all the exact qualities of the native *septic acid.* But they grossly deceive themselves. None of the experiments on the *nitric acid of the shops,* or any of its vapours, &c. have any tendency to lessen the evidence derived from *septic acid and its gas, as engendered in corrupting bodies, and exhaled* from them into the air."

"YELLOW FEVER, a name given to an acute disease, which, during hot weather, particularly in August, September and October, prevails among human beings on the continent of

North-America and the West-India Islands. It also occurs in the south of Europe, on the coast of Africa, and towards the tropical regions of Asia. In a particular manner it originates and prevails in ships and sea-vessels of all kinds, which are suffered to become nasty with excrements and other corrupting animal matter.

" The term " yellow" is given to the disease, because many who are invaded by it become tinged, or even deeply tinctured with that colour. This change of complexion is no sign of the fatality of the disease, since many persons recover after having become remarkably yellow. In many cases the yellowness increases or comes on after death: But frequently too, it happens, that persons who undergo severe attacks have little or no yellowness. The word, therefore, being employed to express a symptom which many cases of the disease do not possess, is very improper. It is sufficiently clear, that the yellowness is not owing to absorbed or regurgitated bile. It is, therefore, wholly different from the hue which prevails in jaundice.

" It has been called a " fever" too, though many persons have undergone it, without the preceding chill, augmentation of heat, or increased frequency of pulse, which the nosologists consider as necessary forerunners. Persons have often died of what is called yellow fever, without having had either *yellowness*, or the diagnostic signs of *fever*. So imperfect and improper is the name of this distemper.

" The malady has also been distinguished by the appellation of " black vomit," because, in some of the worse forms of it, the sick eject from the stomach a dark-coloured or blackish liquid. This, however, is only a symptom of certain violent cases, but by no means a characteristic of the disease in all instances.

" Some of the French writers have called it the " disease of Siam," from an erroneous notion that it was imported into America from that part of Asia.

" Yellow Fever (for we must call it so, notwithstanding the impropriety of the phrase) seems to have an immediate connection with an atmosphere locally vitiated. The common mischievous agent is septic acid vapour, formed from such animal and vegetable substances as contain its radical azote or septon. This acidifiable basis becoming oxygenated, is highly active and deleterious, exciting a multitude of bad effects upon constitutions predisposed to be acted upon by it.

" The places where this mischievous agent is most readily

formed, and most highly concentrated, is on board sea-vessels which contain corrupting fish, beef and hides. These articles constitute a large proportion of the cargoes, with which the vessels are loaded which pass between the United States and the West-India Islands. They frequently get into a putrefactive state on board, and then the exhalations, pent up in a tight vessel, become very thick and venomous. Hence it happens, that so many of our seamen are cut off in this trade. They are killed by the poison engendered in their own vessels, and that not unfrequently when they are outward bound, but more commonly while they lie in foreign harbours, or are returning home, because there has been longer time given for the septic matter to turn to poison, and insinuate itself through every space within her. Hence the crew are thrown into yellow fever.

"Next to sea-vessels, cities and towns are most unhealthy; because many of them are built upon low grounds, are inhabited by intemperate and nasty people, and are governed by a wretched police. Beef, fish, hides, and other corrupting things, are usually stored and kept indiscriminately within them, and often vitiate the atmosphere to a noxious degree. In many places, the foundation of the streets, houses, and yards, is a mere collection of putrid mud, corrupting recrements, and animal offal, hardened by commixture with some sand by pressure and by paving. And in addition to these abundant and alarming causes, it is the fashion in the American cities, to collect and retain all the excrements of the inhabitants from year to year, and from century to century. In New-York and Philadelphia this precious material is preserved with great care and expense. The proprietors of lots dig deep pits into the earth, and these they surround with walls of brick and stone, and cover with strong timbers and planks, that nobody may have access to it and steal it away. Here the owners flatter themselves it lies safe and dormant; but they are mistaken. Already has this accumulated excrement poisoned their water; and annually, when the weather is hot enough, does it rise in pestiferous steams, infect the atmosphere, and sicken or destroy those from whose bodies it was discharged, as well as others. Hence, next to ships, cities are the most frequent manufactories of this kind of poison, and undergo most inconvenience from the pestilential distempers which that offspring of nastiness and corruption excites.

"From the like materials which poison ships and cities, may particular tracts of country, individual houses, single rooms in

a house, or even particular parts of a chamber, become charged with materials that may turn to pestilence, kindle up "yellow fever," and end in "black vomit." Hence we hear of this distemper now and then in the interior parts of the land, far away from ships and sea-port towns.

"Its exciting cause may even be engendered in the human stomach and bowels, from the septic materials of our food. Hence sporadic cases of yellow fever have occurred to individuals who had never visited a ship or a city, and who lived in a healthy neighbourhood, and in a clean house. It is possible for such a person to be thrown into yellow fever from septic acid engendered within his own alimentary canal.

"Yellow fever has been said to be *imported* from foreign places into the United States. And with this opinion many of our citizens console themselves. They are positive that the distemper originates solely in the West-Indies, and is merely derivative to themselves. To these persons it is a sufficient reply, that the West-Indians are quite as positive that it never arose spontaneously in their towns or habitations, but in all cases, without exception, is *imported* to them from New-York, Philadelphia, Baltimore, and our other Atlantic settlements. The truth is, that it does in some degree arise from local and domestic causes in all these places, and, more especially, is locally engendered on ship-board. Nasty, and poisonous ships, the manufactories, the nurseries and vehicles of yellow fever, thus sail from port to port, and give colour to the unhappy and pernicious notion, that the place from whence they last came is sickly; whereas, there is in fact no more connection between the sickliness of a crew, and the state of health in the place whence the vessel sailed, than there is between the corrupting of a cargo of provisions and the latitude of the place at which they were salted.

"Though the exciting cause of yellow fever may be on board a ship from a West-India port, that port or place has nothing to do with it, for it was bred on board the vessel. The way to destroy it, is to cleanse the vessel: and vessels, when nasty, may be rendered clean, by the same means that houses are purified; to wit, by ley, alkaline salts, and lime.

"The exciting cause of yellow fever is, therefore, locally produced *within ships*, and not imported *from foreign countries*. It is, consequently, *not contagious*, as some have mistakenly supposed."

We have examined, with some care, what words standing in the former edition have been left out of this. Some of them

are rare and useless words, found only in the writings of the early *Greek* physicians, which are but of little moment at present. Others are terms gathered from the *Arabian* authors who formerly wrote on medicine, but whose sentiments are scarcely worth the trouble of finding out. Another class of the expunged terms was derived from the *Alchemists* and the *Schoolmen.* Various *Indian* and *barbarous* names have been omitted; and, lastly, some of the *Generic* denominations of plants, not known to be of any use in medicine or the arts, have been thrown aside as mere stumbling-blocks in the way. No student needs to regret the want of such a collection of obscure and frightful words. On the contrary, they have reason to rejoice, that the publishers, employing their hands like skilful gardeners, have extirpated so many of the weeds. For our own parts, we could wish they had examined a little more narrowly, and pulled up by the roots a number more which we observe to be still occupying the ground, and showing their heads here and there among its choice and valuable productions.

Upon the whole, considering this the best edition of Doctor QUINCY's Lexicon extant, we have no hesitation to recommend it to those who are in want of a Medical Dictionary.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

Correspondence between the Secretary of the Navy and Dr. MITCHILL, *concerning the Dampness which the Gunpowder of the Ships in the American Navy was liable to acquire during a Cruise.*

THE SECRETARY OF THE NAVY TO DR. MITCHILL.

SIR, *Navy Department, January* 11, 1803.

THE cannon powder manufactured in this country acquires, in the course of a cruise, a dampness that renders it unfit for use for a second cruise. This effect it is believed has principally proceeded from the not refining in a proper manner the saltpetre used in the powder.

This communication I make to you, in order that I may have the benefit of your information upon this interesting subject, and that our manufacturers may thus be assisted in ascertaining the ingredient that occasions this dampness, and the best process for extracting it.

With great esteem, I am, Sir,
Your obedient servant,
R. SMITH.

DR. MITCHILL'S ANSWER TO THE SECRETARY OF THE NAVY.

SIR, *Washington, January* 14, 1803.

All the component parts of gun-powder require particular care to render them fit objects of that important manufacture. Different processes have been instituted to prepare, in the proper manner, the charcoal, the brimstone and the saltpetre. The preparation of the carbone is so plain, that the common workman can readily drive off the phlogiston, water and other volatile ingrediients from the proper kind of wood, and preserve the coal in a state fit for this or any other use. The preparation of sulphur is equally simple; for by exposing earth or other mineral productions with which it is blended, to the operation of a convenient heat, in close vessels, there takes place, by dry distillation, a separation of the pure material from the foreign substances with which it had been associated.

The fault you mention in the cannon powder with which the ships of the navy have been furnished, ought not therefore to be ascribed to its carbonic or sulphureous ingredients. For, besides the plainness and simplicity of their preparation, neither of them possesses the power of attracting moisture from the atmosphere in any memorable degree. The former does not unite chemically with water; and the latter shows very little disposition to combine. They may both be considered as averse to form a connection with that fluid.

The evil complained of must then be sought for in the other constituent part of the powder, the SALTPETRE. An examination of the component ingredients of this compound salt will be likely to inform us where the mischief lies.

Saltpetre consists of three distinct materials. 1. Potash: 2. The acid of putrefaction; and, 3. Water. These are combined in certain proportions, and made to cohere by an attractive force. When the constituent parts are pure, and well proportioned, they form fine and unadulterated saltpetre.

But it very often happens that some of the component parts of saltpetre are not pure; or if pure, not compounded in due proportions.

1. The potash, or alkaline basis of saltpetre, is frequently imperfect in its constitution, or vitiated by foreign admixture. Common or sea salt is sometimes combined with it. This, however, is not all. A mixture of lime is often derived from the plaster and other calcareous matter, which abounds in the saltpetre beds and collections. This earth has been found, by experience, to weaken the strength of the powder in two ways. 1. By adding to the weight of that manufactured article, unacidified lime, which is an inactive ingredient, and which has no explosive force; or, 2. By disposing powder to grow damp, whenever acidified lime exists in the form of a septite, and exercises its inherent attractive power of imbibing moisture from the atmosphere and other surrounding objects. In the former case, powder, though dry, will be weak; in the latter, it will imbibe humidity, and also be weak of course. Some years ago, under the French Monarchy, the want of a due explosive force in the powder with which their artillery was served, became a subject of public inquiry. The Academy of Arts and Sciences traced it to an accidental adulteration with lime and calcareous matter, in the Parisian manufactories. To obviate this difficulty, they recommended an addition of as much good Russian or other potash to the saltpetre beds as would saturate completely all the septic acid, and of

course discharge or precipitate all the lime. By attention to this, the quality of the saltpetre was improved. This may be done when saltpetre abounds either with combined or uncombined lime. Dissolve it in water, and pure potash added so as to saturate it exactly, will detach every atom of lime from its connection. Both the inconveniences above mentioned will be thus prevented.

2. The septic acid may possibly be defective or vitiated in some cases. Of this, however, we know little; and the little we know leads us to be very far from believing the *acid* ingredient of the saltpetre to be much in fault. That sour product of putrefaction is commonly active enough. When floating at large in an aerial form, and poisoning the atmosphere with a pestilential taint, its epidemic ravages are but too well known. It would seem that when held in bondage and enchained by potash, its destructive career was run, and would never be begun again. But it is a curious and admirable fact, that that pernicious acid, which, before its connection with potash, was the chief instrument of pestilence, should, in the act of extrication and enlargement (destructive like dying Sampson), be the principal engine of war. As far as the power of this agent goes, it is mostly strong enough.

3. In a crystallized form, saltpetre, like all other salts, contains a quantity of water. But this water is in a latent state, and not discoverable by an hygrometer. For all the purposes of touch, the substance may be pronounced dry. In a pure and perfectly saturated state of septic acid and potash, there will be no attraction of water from the surrounding air, and consequently such saltpetre will not attract moisture nor cause dampness in the gunpowder into whose constitution it enters.

On the whole, Sir, I believe the fault you find with your cannon powder is to be referred to impurity or adulteration in the saltpetre. There appears good reason to conclude, that the evil will be remedied by a removal or correction of these. I therefore recommend that great care be taken to refine and crystallize the saltpetre. The approved method of doing this may be seen in Rees' edition of Chambers' Dictionary (article Petre), and indeed in most of the books of modern chemistry. By attention to these directions, saltpetre may be obtained in such a state of purity as to make a strong and efficient powder for your cannon, to the annoyance of the enemies of our country.

I have, &c. &c.

S. L. MITCHILL.

COMPARATIVE ANATOMY.

The Anatomy of Animals has been enlarged considerably by a work in quarto, of 118 pages, published in Bremen, by Dr. I. A. Albers. It appeared in 1802, and seems to be the commencement of a series of numbers, on the dissections of various animals. It is entitled "Beyträge zur Anatomiè und Physiologiè der Thiere met einer kupfertafee." For the information of our readers generally, and especially for such of them as are engaged in studying and teaching anatomy, we make an abstract of the principal subjects upon which it treats: 1. Dissection of the Sea-dog (Phoca vitulina), with a particular description of its skeleton. 2. On the eyes, heart, and Os Hyoides of the Ice-bear (Ursus maritimus). 3. Dissection of Birds. *a* The Buzzard or Falco Buteo. *b* F. apivorus. *c* F. æruginosus. *d* F. nisus. *e* F. Aesaton. *f* Strix Aluco. *g* Psittacus Aracanga. *h* Corvus glandarius. *i* Oriolus Galbula. *j* Anas Moschata. *k* Anas clangula. *l* A. glaucion. *m* A. fuligula. *n* A. clypeata. *o* Colymbus glacialis. *p* Larus ridibundus. *q* Plateala. *r* Charadrius hiaticula. Then follow observations on the construction of the eyes of birds, particularly as respects their cornea, sclerotica, the ciliary ligament, and the iris. And the work is concluded by some physiological *remarks on the respiration* of birds, and an account of a Worm, discovered by Professor Rudolphi, called Strongylus Gigas. The curious in these researches will find much to inform and amuse them in Dr. Albers' work.

REWARDS FOR USEFUL IMPROVEMENTS BY THE IMPERIAL PARLIAMENT OF GREAT-BRITAIN.

We observe by the printed debates in the House of Commons, that Dr. Jenner's petition for a reward in relation to his discoveries in vaccine inoculation, was acted upon on the 3d of June 1802. The motion for rewarding the petitioner with £10,000, was made by Admiral Berkley, and seconded by Sir H. Mildmay. After a conversation, in which Mr. Banks, Mr. Wyndham, Sir James E. Sinclair, Mr. M. A. Taylor, Mr. Hobhouse, Mr. Fuller, the Chancellor of the Exchequer, Mr. Grey, Mr. Wilberforce, and Mr. Courtney, each bore a part, some proposing a larger, and others a smaller sum, Admiral Berkley's motion prevailed by a majority of three votes, there being on a division 59 for, and 56 against it.

On June 24, 1802, Mr. Wilberforce reminded the house of Dr. Carmichael Smyth's petition for a reward, in consideration of his discovery of nitrous fumigation as a preventative of

infection. The motion was seconded by Mr. Erskine, and supported by Mr. D. Scott, Lord Glenbervie, Mr. Courtney, General Loftus, Sir A. Hammond, and Mr. Addington. The motion was to pray his Majesty to advance the petitioner £5000, and that the house would make good the same. It was carried *nem. con.*

It is curious to observe the proceedings on these petitions, that the reward to Dr. Jenner, for his great and real discovery, could be carried only by a majority of three votes, while that for the pretended and worse than useless discovery of Doctor Smyth should pass unanimously! It would have been more worthily bestowed on Dr. Trotter.

DE WITT'S MAP OF THE STATE OF NEW-YORK.

New-York, at length, possesses an entire and ample map of its territory. The labours of Simeon De Witt, the Surveyor-General, have prepared the materials for publication, and under his eye, Mr. Fairman, the engraver, has executed this work, which has lately been offered to our desiring citizens. There is reason to believe this is, at least, as correct as any map on the American continent. It would perhaps be invidious to say it was more so. In addition to good natural capacity, improved in geometry and astronomy by an excellent education, both theoretical and practical, Mr. D. has possessed, in an uncommon degree, the means of rendering his map exact and complete. For, from the maps formerly extant, he could derive the territorial lines long ago adjusted, on the coast of Long-Island, and between the neighbouring states of Connecticut and New-Jersey. From surveys made since the revolution, and in which he was present and assisted, has Mr. D. acquired a knowledge of the boundaries on the side of Massachusetts, Vermont, and Pennsylvania. The Quebec line, on the 45th degree of latitude, was ascertained by the British government many years ago, and Mr. D. has had great opportunities, in the progress of the surveys of the new lands, to become intimately acquainted with the shores of the river St. Lawrence, and Lakes Ontario and Erie. So much for the outlines or boundaries of a territory extending from the Atlantic ocean to Lake Erie.

Nor has Mr. D. been less fortunate in collecting materials for filling up and finishing this great outline. The State of New-York is divided into territorial districts, called counties, and these counties are subdivided into towns. The county lines being always the exterior or boundary lines of towns, it appeared

very early on a suggestion of Mr. D. to the Legislature, that, to accomplish the meditated work, a regular survey ought to be procured from every town in the State. The Legislature instantly perceived the force and propriety of this, and directed the Supervisors of all the towns in all the counties from which Mr. D. should require actual surveys of those towns, respectively to furnish them. He was enabled thus to add to the information already in his possession, all the other knowledge from the whole of the State, or any part of it, that he should deem useful for completing the map. During the Legislative session in 1798, Dr. Mitchill was one of the Committee for the House of Assembly, to devise means for obtaining complete returns from some of the delinquent Supervisors.

Mr. D.'s map thus exhibits an entire view of the state of the counties in the State, and of the towns in the counties.

The very irregular form of New-York rendered it impossible to delineate it on a square in the common manner, without including much extra space. This space has, however, been so occupied by Mr. D. that his map, without being made unsightly by blanks and chasms, is rendered greatly more valuable by the additions he has made, of the contiguous parts of New-Jersey, Connecticut, Massachusetts, Vermont, and New-Hampshire. With these supplementary materials, the parts of the sheets not occupied by New-York are agreeably and instructively filled up.

This valuable addition to American Geography is of a size sufficiently large to admit considerable expression in detail. Its extent from E. to W. is four feet and an half, and from N. to S. five feet and an half. It is done in a style, reputable both to the Surveyor-General, and the commonwealth which employs him.

MITCHELL'S MAP OF NORTH-AMERICA.

An instructive map of North-America was published by Dr. Mitchell, in London, about the year 1776. It was afterwards translated and edited in French, by Le Rouge, at Paris, in 1777. This contains notes and explanations in German as well as French. The map is very large, being about six feet from E. to W. and five from N. to S. It includes the country from beyond Fort-Albany, in Hudson's-Bay, to the region south of St. Augustine, in Florida; and from Newfoundland to the head-waters of the Missouri and the other streams from the west. Apparently this was the most complete map of North-America extant at the time of its publication, and even now

is well worthy of being consulted, as it bears examination very well. It is to be wished we had a connected biography of the author. He seems to be that Dr. Mitchell who published several well-written essays in the London Philosophical Transactions—who examined the vegetables of Virginia, and forwarded them, with descriptions, to Linnæus—who is quoted respectfully by Robertson, in his History of America, in note 38 and 39 to book iv.—and whose manuscript on yellow fever is frequently cited as an authority by Dr. Rush.

SUPERIOR SALUBRITY OF THE NORTH-AMERICAN CLIMATE.

William Constable, Esq. in a letter, dated Greenwich, 20th June, 1802, has written thus to Dr. Mitchill:—"Having purchased the late numbers of your excellent Repository, to send to my friend Swediaur, at Paris, I was struck with the bill of mortality for Portsmouth, as published in your fifth volume, which gives us not quite one death out of fifty-one persons in that town annually, and shows a degree of salubrity in the air and climate I believe altogether unexampled.

"I have, before me, a statistical account of Montpellier, published last year by Morgue, by which the number of deaths appears to be one in 29½ in one of the most healthy cities in Europe; and as Mr. Morgue has kept his register for twenty years with the greatest attention, there can be no doubt entertained of its correctness; indeed, it bears every appearance of accuracy. If, therefore, Dr. Spalding's return can be relied on, we may boast of a climate far more favourable to human life than any known, though the number dying of consumption, (being twenty, or one-fifth of the whole deaths, one hundred) would seem to argue the contrary. By the by, I am greatly surprised to remark such a number, three-fourths of whom, it would appear, were 35 years of age and upwards; as I had conceived an idea (very probably erroneous) that after thirty there was little danger of dying of pulmonary consumption, if that is meant. I throw out this hint to excite inquiry. I recollect to have read some papers formerly in the Philosophical Transactions of Massachusetts, as also in those of the Philadelphia Society, showing the chances of human life to be greater in the Eastern States than in Europe generally: the facts were taken from some small registers kept in Connecticut and Massachusetts, but the difference was by no means so great as a calculation founded on the Portsmouth bill of mortality would make it.

PERNICIOUS EFFECT OF SEPTIC ACID COUNTERACTED BY LIME.

In the neighbourhood of the street de la Lingerie, in Paris, was yet, of late, a burying-place, where the dead were buried from twenty-four parishes, and wherein, amongst others, in the year 1779, fifteen or sixteen hundred corpses, almost at once, have been interred in a ditch fifty feet deep: the consequence was, that in the year 1782 the cellars under the adjoining houses were poisoned, insomuch that no candle would burn therein, and the persons who ventured to enter them were threatened with suffocation and other bad symptoms. This was naturally to be expected; but remarkable and new it is, that the moisture on the inner walls contained such a terrible poison as scarcely may be found throughout nature. A mason happened to touch the moisture with his hand; three days after, the hand, with the arm (antibrachium), was very much swollen, with great pain, &c. blisters appeared, and, at last, the whole of the epidermis was taken off.

The poison was not rendered inactive before the ditch was covered about half a foot deep with quick-lime, and the further interring discontinued. It is almost incredible, that, some years before, the neighbours beginning to complain about it, the judicium of a certain much celebrated practical physician, Dumoulins, was, that the air impregnated with the exhalations of dead bodies was the most salutary balsam of life that could be inspirated! The black snow of Anaxagoras is nothing in comparison with this!!

[*Litchtenberg's Mag. der Phys.* 2 B. 2 St. p. 177.

MACHINES FOR SAVING LIFE IN CASES OF SHIPWRECK.

Various have been the inventions for preserving the lives of men, when endangered by the sinking or wrecking of vessels in which they sail. The *Life-boat*, constructed by Mr. Greathead, of *South-Shields*, and the *Life-buoy*, recommended by Lord Henniker, are two of the most approved and modern of these humane improvements. Plates and descriptions of them both, may be seen in the annual report of the Royal Humane Society of London for 1802, drawn up by its founder, the philanthropist W. Hawes, M. D. (See that valuable publication, p. 50—53.) An attempt has been made very lately in America, to effect some means of escape from wrecks at sea or on coasts. The inventor is Mr. A. Dubuc Marentille. The description of his machinery and apparatus was printed at Elizabeth-town, New-Jersey, in 1803, in a pamphlet of 18 pages.

His project is threefold. 1. To construct an *unsubmersible*, or *uninversible boat*. 2. To adapt a few planks to each other very expeditiously in times of danger, so as to form a floating body called a *Wreck-raft*. 3. To form a swimming box, in which a man can rest without oversetting, named a *Sea-sitting-chair*. Mr. Marentille entertains an opinion, that these can be contrived and disposed so as to be easily carried to sea in ships. He affirms them to be cheap, and well adapted to save mariners and passengers in danger of drowning; and he announces that he will exhibit them in New-York, and give further particulars on their construction and use. In this great mart of commerce, which loses so many of its seamen and citizens annually, by the hazards and accidents of its widely extended navigation, there will be ample opportunity of displaying it to the best advantage.

PROGRESS OF MEDICAL EDUCATION IN AMERICA.

Within the last thirty or forty years, and particularly since the termination of the revolutionary war, it has been quite the fashion for students of medicine to qualify themselves for practice by a tedious and expensive tour to Europe. If we judge aright, this custom is on the decline. The opportunities afforded by our seminaries and establishments at home have superceded the necessity of those voyages and journies to foreign countries. On looking over the list of medical graduates at Edinburgh for the 24th June, 1802, we observe that, of twenty-four candidates who were honoured with the Apollonian laurel, seven were from England, five from Scotland, eight from Ireland, two from Barbadoes, and two from Jamaica. *There was not a single one from the United States.* The schools of Philadelphia, New-York, Cambridge, Baltimore, Lexington (Kentucky), and Dartmouth, are engaged in the business of medical education to an extent that is both pleasing and surprising. About sixteen years ago, the remittances to Great-Britain only, for the support of young Americans who were sent thither to be instructed in physic and surgery, amounted to £12,000 sterling per annum at least; and, at that time, the remittances were principally in specie. This was one cause of the scarcity of the precious metals in America, which, though worthy of attention, was scarcely ever believed to be of such serious magnitude. Nothing can more strongly evince the importance of cherishing seminaries in our own land.

LONDON BILLS OF MORTALITY, WITH REFLECTIONS.

There has been published, in 1801, a valuable work, by William Heberden, jun. M. D. F. R. S. It is entitled, "Observations on the Increase and Decrease of different Diseases, and particularly of the Plague, in the City of London." For this purpose he has consulted the bills of mortality of that great metropolis. He has constructed from them two tables. The first contains a view of the annual christenings and burials for each *year* of the eighteenth century; together with the proportion, out of every thousand, who have died of bowel-complaints, palsy, measles or child-birth. The second gives a *weekly* bill of mortality for ten years, to wit, from 1762 to 1767, and 1794 to 1799; and contains a register of those who died of apoplexy, palsy, or suddenly, and by consumption, fever, convulsions, asthma and dropsy; with the periods of life at which the individuals died. From these calculations there appears to have been, during the last century, a gradual decrease of mortality upon the whole, connected with greater wholesomeness of the city under modern police regulations. There has been a most surprising decrease of bloody-flux, colic and gripes, which, in the first decade of the century, carried off above *one thousand* yearly; but which, during the last ten years of it, destroyed only an average of *twenty*. This is to be ascribed partly to the former cause, and, in a particular manner, to better food, and to improvements in cookery and diet. It has hence been discovered that the practice of inoculating for small-pox has, upon the whole, increased its fatality. This arises from its greater spread and frequency: for while, by the natural small-pox, there die one in six, and by the inoculated small-pox three hundred and ninety-nine out of four hundred recover, yet so much more prevalent is this formidable distemper, when kept up and propagated by artificial means, that more human beings are cut off by its multiplied force, when inoculated, than by its casual ravages in the natural way. Apoplexies, palsies, and sudden deaths, have rapidly increased. They are about twice the number that they were a century ago. The proportion of women who die in child-bed is surprisingly lessened, to wit, from one in 42, which was the rate half a century ago, to one in 938, which was the proportion in 1799 and 1800, in the British Lying-in Hospital.—The greatest number of deaths occurs in January, February and March; the smallest in June, July and August; exactly the reverse of the received opinion. Among persons of sixty years old and upwards, the greatest

proportion die in the coldest months, and the fewest in the middle of summer. This is owing to the cold. Palsies and apoplexies, for the same reason, are most prevalent in winter, and so are consumptions. Bowel-complaints are most rife in September and October. The popular opinions, that there is something peculiarly wholesome in a sharp frost, and that wet weather is noxious to the human body, are contradicted by facts. Nor does any peculiar mortality accompany the changes from hot to cold, and *vice versa*.

DR. HEBERDEN ON THE PLAGUE.

This intelligent writer rejects the notion of deriving this distemper from foreign countries. The tales of its being brought from Turkey, Egypt, Ethiopia, and China, &c. he considers as frivolous and idle. The places of its chief residence and prevalence have, in fact, always been the *most nasty parts of unclean, crowded, ill-constructed, and badly-managed cities.* It appears to have grown with the growth of the towns and cities, which were founded on the ruins of the Roman Empire and the feudal system, and to have raged from time to time with greater or less violence, all *over Europe*, until the present improvements in clean dresses, clean houses, and clean cities gradually took place, and gained an establishment toward the end of the seventeeth century. (See Heberden, p. 81, for a catalogue of these events). In proportion to the progress of these beneficial alterations in habiliments, manners, economy and police, has the plague been stifled in its origin and birth-places, and in most of them wholly suppressed. This gives a beautiful and comfortable view of the gradual extinction of that fell destroyer of man. It proves, that *Plague* ever has been the *consequence of nastiness and corruption*, accumulated in the persons, clothing, bedding, habitations and residences of human beings. Wherever pure air, clean water, and alkaline salts have been freely introduced to remove uncleanness, the Plague has uniformly vanished. (For a theory of cleanliness, see our vol. v. p. 191 & seq.) And easy and plentiful supplies of fresh atmosphere, of limpid water, and of neutralizing and detergent alkalies, are the great objects of modern police, in opening and widening streets, in constructing aqueducts and water-works, and in cleaning clothes and houses, &c. By these means, it has been proved by almost all the large cities of Europe, that the plague which they used in former days to breed and nurture, can be subdued and exterminated. While society, manners and customs par-

took of the barbarism of former ages, the plague *perpetually* existed in large cities. And though we commonly hear but of the *great* plague years, when uncommon mortality carried many thousands to the grave, yet it is recorded in the history of those cities, London particularly, that the plague was active *every* year, and destroyed several hundreds, which being comparatively an inconsiderable number, has been generally thought unworthy of notice. It resembled the yellow fever of New-York, Philadelphia, and other American cities; which, though it prevails in some degree every year, only rages with vast destruction at longer intervals of time. In both cases, after a series of years, the *great* calamities only are recollected, and the intervening *moderate* visitations are passed over as non-entities, or are wholly forgotten. It is to be wished, that Dr. H. would trace the change from the *plague* which formerly prevailed, to the *typhus* that *rages now*. Dr. H. in a perspicuous manner, examines the written accounts of the plague, and shows the near resemblance between it and the jail-fever and other malignant and putrid fevers. This he has done with more freedom and talent than we have observed in any European. Such works are calculated to unfetter the human mind, and emancipate it from the superstition and prejudice of former ages. If, as Dr. H. concludes, the cessation of pestilential distempers is chiefly to be ascribed to an happy alteration in manners, to the putting away filth, and to the love of cleanliness in our air, clothes, persons and habitations, how devoutly ought we to labour for the universal prevalence of these *goods*, and for the extinction of their correlative evils!

COAL TRADE BETWEEN THE UNITED STATES OF AMERICA AND FOREIGN PARTS.

Since the country on the shores of the Atlantic has grown bare of its native wood, and the sites of the ancient forests have been turned to plantations, the price of fuel has considerably advanced. Indeed, in some of the larger cities, where wood is the principal material which the neighbouring region furnishes for kindling fires, the expense of purchasing it is one of the heaviest charges upon house-keeping. The average price of oak wood, in the city of New-York, is eight dollars the cord, and of hickory wood twelve dollars the cord. In Philadelphia and some other places it is not quite so dear.

The dearness of fuel has introduced the use of coal. No coal-mines have been discovered or worked to advantage in any place near an Atlantic landing north of Virginia. The

vast quantities with which Pennsylvania abounds are in the interior counties. From James' River, in Virginia, there is established a considerable coasting trade in the coal dug up near its banks. This inflammable material is conveyed by water-carriage to the greater number of the Atlantic sea-ports. There it is consumed to considerable extent, and would be burned to a far larger amount, had it not to force its way, and make strong competition with the coal which, in the course of trade, is imported from foreign parts. It frequently is found convenient to take it on board as ballast, and the excessive price of wood in the American cities generally enables the carriers of coal to sell it to advantage. Thus the burning of native coal, and of foreign coal, tends to spare our forests, and to reduce, in some degree, the exorbitant price of wood.

The quantity of coal imported from foreign places between the 1st of October, 1800, and the 31st of September, 1801, was as follows; to wit:

In American bottoms,	363,148 bushels.
In foreign bottoms,	301,911
Amounting to a grand total of	665,059

Of this, the quantity brought from Great-Britain was a very large proportion of the whole. Thus there was imported from

England, that year,	349,509 bushels.
From Scotland,	233,553
From Ireland,	64,888
	647,950 bushels

of coal in the course of direct trade. The remaining 17,109 bushels comes chiefly from the same places, by a more circuitous route. At the rate of thirty-six bushels to a chaldron, $36 \div 665{,}059 = 18{,}473$ chaldrons, and upwards, of British coal, at least, may be considered as consumed annually in the United States.

CATALOGUES OF BOOKS, PAMPHLETS, AND OTHER PUBLICATIONS RELATIVE TO AMERICA.

A valuable list of authors, and their works on America and American affairs, was made out by WILLIAM ROBERTSON, D. D. and prefixed to his history of the Western World. This monument of this eminent historian's industry and learning answers the twofold purposes of showing to his readers the sources of his information, and of pointing out to his studious successors, the names of the writers, and the titles of their

works. Afterwards THOMAS JEFFERSON, Esq. gave to the public, in his Notes on Virginia, an instructive catalogue, in chronological order, of many American state papers, with references to the places where they are to be found. The former of these relate more particularly to the West-Indies, and to Spanish America; the latter have a more direct reference to British America, and to the country which is now *Fredon*, or the United States. Both are remarkable for their accuracy. More recently, a collection of state papers was published by EBENEZER HAZARD, Esq. In this important work, a large number of the grants, patents, charters and other documents are published at full length, and are open for the inspection of the American inquirer. We judge from the catalogue of the Historical Society of Massachusetts, that the library of that noble institution contains many precious materials; and the contents of the volumes which they have collected and printed, show how worthily the Rev. Dr. ELLIOT and his associates have laboured. This worthy band of literati are industriously gathering in and preserving the abundant harvest of the historical field, which goes on to yield a more rich and increasing crop from year to year. The Abbé CLAVIGERO's catalogue of the European and Creole authors, who have written on the doctrines of christianity and morality in New Spain, is a curious part of his elaborate history of Mexico. The student of American transactions will be greatly edified and assisted by another chronological catalogue, printed in London, for J. Debrett, in 1789, 4to. pp. 270, and intitled, BIBLIOTHECA AMERICANA. This long enumeration of authors and publications is said to have been begun by Mr. HUMPHREYS, Secretary to the society for propagating the gospel in foreign parts. The work contains an enumeration of the American publications in that society's library. It includes also the list of books and manuscripts relative to North-America and the West-Indies, contained in Sir HANS SLOANE's and Dr. BIRCH's collections now in the British Museum, and among the other books belonging to that learned body. These are digested from the general catalogue edited in 1782 and 1787, by SAMUEL AYSCOUGH. To these extracts is subjoined an extensive catalogue from other sources. This very copious Index the inquirer into American history may consult with great aid and edification.

CONDITION OF THE POOR IN THE CAPITAL OF NORTH-BRITAIN.

There is no reason to refer the plague, typhus, and puerperal fever of Great-Britain to foreign causes. Enough of

domestic uncleanness and wretchedness exists among the indigent members of society, to stir up all these, and, indeed, worse calamities. There is an address to the public respecting the situation of the poor of Edinburgh during the season of child-bearing and lying-in, which contains important information. It may be deemed authentic, as it is subscribed by William Fettes, Esq. Lord Provost of the city, June 6, 1801. It states that "those benevolent individuals who have taken the trouble of visiting the habitations, and inquiring minutely into the circumstances of the lower ranks of society there, have found that the working poor who live in the married state, in general, reside in habitations consisting of a single apartment, ill ventilated and miserably furnished. The nature of their dwellings deprives them of the comforts of pure air, cleanliness, and rest of body and mind. During the day, a lying-in woman must be exposed to the foul air, noise and bustle of a number of children confined within a single apartment; and during the night she must be disturbed by all the individuals of the family crowding into the bed which ought to be appropriated to her sole use."—From this account it appears that the lower orders of society literally wallow and welter in their own filthy excretions adhering to their skins, clothing, bedding, and apartments; and these excreted fluids turning to poison by fermentative or other chemical action among their constituent parts, in the temperature of the human body (or 96 deg. of Fahrenheit's thermometer), and under open atmospherical influence, excite the fevers and febrile distempers which cause so large a part of the mortality, and of the municipal and medical regulations of the populous towns and cities of Great-Britain. Compare this with the addresses to the inhabitants of Manchester and Leeds (Med. Rep. vol. vi. p. 110), and with observations on the people of Tangiers (ibid. p. 334), and consider whether alkaline detergents are not the best and cheapest preventatives of this home-bred mischief.

SITUATION OF THE BRITISH POOR AT NEWCASTLE UPON TYNE.

A sensible, judicious, and humane address has been published, May 14, 1802, by a committee, of whom the Rev. Dr. PROSSER is chairman, for forming an institution to cure and prevent the disorders incidental to poverty, filth, and nastiness, among the poor of Newcastle upon Tyne, and Gateshead, in England. The committee give an affecting account of the

crowded, unclean, and stifled chambers of their indigent and wretched fellow subjects. In plain terms, the narrative runs thus:—For want of sufficient food to nourish them, of fair water to wash them, of alkaline solvents to cleanse them, and of the pure atmospheric fluid to ventilate them, these unhappy people sink under misery and calamity of the most afflicting kind. Their stomachs and alimentary canals grow torpid for want of the proper stimulus of food and drink to raise excitement; their lacteals and blood vessels languish through denial of alimentary supplies; their strength is prostrated by defect of nutriment and substantial recruiting; their clothing becomes saturated with their perspiratory and other excrementitious discharges; their bedding requires a full charge of the same offensive and loathsome productions; the skin and whole exterior surface of the body is besmeared and begrimed with the like foul and nasty agents.

Fœcal, urinary, perspiratory and other excrementitious mischiefs thus surround the starving and filthy victims of poverty. The rags and wrappers apply and confine the baneful materials with which they are impregnated most closely to the body of the sufferer. In the temperature of such a body (96 deg. or thereabout) these excreted matters ferment, and oftentimes turn to a kind of pestilential poison. This virus, engendered in such degenerating and corrupting masses of excretions, turns its force upon the body that produced it. Thus the venom of pestilence, superadded to starving and nastiness, prostrates the suffering individual more completely and fatally.

The calamity does not always end here. The heat to which these human excretions are exposed is sufficient, not only to convert them to poison, but to elevate them in vapour. The more volatile parts mount towards the cieling, while the more gross and palpable descend to the floor. The air and walls of the apartment become tainted with noxious effluvia. The patient inhales them at every breath; they gradually diffuse themselves to the most distant part of the chamber. In short, the deleterious gases mingle with the atmosphere, and, according to the quantity, the force, and the concentration of the septic emanation, will be the danger of the attendants, bye-standers and visitors. Frequently this aërial offspring of nastiness is too bad for mortal man to bear, and then it sickens and destroys all before it. AKENSIDE, BAILEY, GARNETT, RUSSEL, GRIEVE, MUNCKLEY, and a host of others have been killed by its direful activity.

The committee are intent upon the means of granting re-

lief to persons thus afflicted. And we observe, with great satisfaction, that the sum of their laudable exertions amounts to this; *to obtain for them better food and drink; to make their bodies clean; to procure them clean clothes and beds; and to provide them a wholesome and pure atmosphere.* Behold an epitome of what is called TYPHUS-CONTAGION, of British FEVER WARDS, and of their HOUSES of RECOVERY!!

Principiis obsta; serò medicina paratur, &c. is a good monition. Why do not these benevolent associations introduce among the poor the use of lime, ley, and other modes of alkalizing at once, and thereby cut up this wide-spreading and ever-growing UPAS TREE by the roots? (See our vol. v. p. 191 & seq.)

It does appear passing strange, that in the present period of society and observation, this *mere septic effluvium* should be conceived to be *a contagion.*

DEATH AND DISSECTION OF THE MAN WHO COUGHED UP STONES FROM THE LUNGS. (*See Med. Rep.* vol. vi. p. 258.)

Joseph Shildigger continued to linger until the 31st of March, 1803. His principal symptoms were increasing dyspnœa, with an expectoration of mucous and purulent matter, sometimes mingled with blood. The expectoration of the stony concretions also continued as before. About three weeks before his death his pain entirely left him; but his difficulty of respiration and shortness of breath increased so much, that he was obliged, by the intolerable anxiety, to preserve an erect posture night and day. At this time an anasarcous swelling of the feet and ancles became sensible, and before he died had spread throughout all the cellular membrane even up to the neck, every part of the body pitting upon pressure.

On opening the body after death, the lungs were found in a most diseased and infarcted condition. Stony concretions were discovered in almost every part of their substance; they, however, were largest and firmest in the lymphatic glands, situated near the bifurcation of the trachea. They were impacted with earthy matter; but though the terrene deposition of the lungs was so extensive and abundant, it was not every where of equal hardness. Some portions were very much indurated, some were moderately firm, and others again in a soft state. The colours varied from a blackish or gunpowder, through different shades of brown to a yellowish hue. In one part there was an adhesion of the right lobe of the lungs to the pleura costalis, and at this point of connection there was a more con-

siderable stuffing with the earthy concrete than in any other, the viscus seeming to be almost turned to a petrifaction.

BILL OF MORTALITY FOR NEW-YORK.

To Mr. John Pintard, of this City, we are indebted for the following Statement:

"With some pains we have prepared a general bill of mortality from the 1st of November, 1801, when the reports were first commenced, until the last of December, 1802, a period of fourteen months. Of the disorders with which helpless infancy is afflicted, *fits* appear to be more fatal than even the *small-pox*, the ravages of which, thank Heaven, will shortly be erased from the direful catalogue of human maladies. Among the casualties, *drowning*, in consequence of our insular situation, is very frequent: twenty-seven instances occur within the period of twelve months. Within the same term, nine instances of the awful crime of *suicide* are enumerated! In the table of diseases *consumption* usurps a frightful preeminence. The cases of mortality under this head amount to nearly *one-fourth* of the total number of deaths. It is only our province to present this gloomy prospectus of "the evils which flesh is heir to." To the physician belongs the more important duty to contemplate the subject, to endeavour to counteract the baneful effects of our variable climate, and to check, by salutary advice, the pernicious consequences of implicitly following the follies and fashions of *dress*, not even judiciously adapted to the more temperate meridians of London and Paris.

"This aggregate view will evince the utility of these reports. The public mind, accustomed to weekly reports, becomes less agitated and alarmed at the sound of death. Medical men, informed of the endemic diseases of our climate, can more effectually devise an antidote. The progress of increase and population can be estimated by these tables, which, to be rendered more complete, ought to be accompanied by those of births and marriages. The melancholy back-ground of mortality ought to be relieved by the more cheering and enlivening scenes of nuptials and christenings. The folio of *profit and loss*, in the records of human existence, cannot be fairly balanced without these tables, for a faithful report of which no provision is as yet made. We are happy to find that a recent act of the Legislature has enabled the Corporation of this city to render the bills of mortality, henceforward, more perfect than they have for some time past appeared. It is sin-

cerely to be hoped that the clause relative to this head will be rigidly enforced.

Interments in the Burial Grounds of the City of New-York, from the 1st of November, 1801, to the 31st of December, 1802.

	Adults.	Children.	Undistinguished.	Total.
African Church	7	8		15
African Episcopal	1		1	2
African Free		4		4
African Methodist	18	29		47
African Methodist Episcopal Zion	3	4		7
African Society	1	2		3
African Burial Ground	49	77		126
Associate (Scotch) Church	1	3		4
First Associate (do.) Reformed	8	17		25
Second Associate (do.) Reformed	11	19		30
First Baptist	16	26		42
Cameronians	1	6		7
Christ Church	13	36		49
Dutch Reformed	74	135		209
Friends	16	12		28
German Reformed	4	6		10
Hebrew	5	5		10
Lutheran English	17	24		41
Lutheran German	22	29		51
Methodist	25	64		89
Presbyterian	77	126		203
St. Peter's	65	70		135
St. Paul's	110	149		259
Trinity	111	188		299
United Brethren	8	1		9
Universalist	1	2		3
Pottersfield	111	75	302	488
In different burial grounds			20	20
	775	1117	323	2215

Diseases.

Abscess	3	Bite of mad dog	1
Abscess on brain	1	Breaking out	1
Apoplexy	6	Burn	10
Ascites	1	Cancer	5
Asthma	5	Carbuncle	1

Casualties	26	Jaundice	13
Childbed	27	Inflammation	8
Child distemper	1	Inflammation in lungs	7
Chin-cough	9	Inflammation in bowels	14
Colic	1	Influenza	1
Colic painters	1	Inward gathering	1
Cold	15	Killed and murdered	4
Cold after measles	1	Lax	77
Complication of diseases	1	Lethargy	1
Convulsions	15	Lingering illness	2
Complaint in stomach	1	Lock-jaw	4
Cramp in stomach	3	Mania	1
Consumption	395	Measles	131
Debility	20	Mortification	2
Decay	27	Nervous affection	1
Decline	37	Old age	51
Derangement	2	Palsy	18
Diarrhœa	5	Phthisis pulmonalis	54
Dropsy	53	Peripneumony	8
Dropsy in breast	1	Pleurisy	24
Dropsy in head	13	Quinsy	1
Drowned	27	Rash	1
Drunkenness and intemperance	11	Rheumatism	1
		Rickets	1
Dysentery	24	Rupture	1
Epilepsy	2	St. Anthony's fire	2
Fever	19	Scrophula	3
Fever, bilious	7	Scurvy	1
Fever, hectic	1	Small-pox	108
Fever, intermitting	6	Sore throat	7
Fever, malignant	3	Sore leg	1
Fever, nervous	15	Spasms	1
Fever, putrid	5	Sprue	19
Fever, scarlet	17	Stoppage	1
Fever, slow	2	Stoppage on lungs	1
Fever, yellow	1	Still-born	7
Fits	139	Swelling	1
Flux	8	Sudden death	39
Found dead	1	Suicide	9
Fracture	1	Syphilis	7
Fistula	1	Teething	30
Gravel	3	Thrush	1
Hives	46	Typhus	2
Hydarthrus	1	Vomica	2

Vomiting blood	2	Worms	31
Vomiting and purging	10	Worm-fever	5
Ulcers	2	Diseases not mentioned	498
Whooping-cough	15		
Ditto and measles	7	Total	2215

Recapitulation of the Number of Deaths from the 1st of November, 1801, to the 1st of December, 1802.

		Adults.	Children.	Undistinguished.	Total.
1801.	November	54	67	17	138
	December	48	55	44	147
1802.	January	57	84	23	164
	February	64	116	12	192
	March	67	117	45	229
	April	52	71	21	144
	May	51	62	10	123
	June	30	42	23	95
	July	44	72	17	133
	August	54	169	25	248
	September	55	88	12	155
	October	65	65	14	144
	November	49	61	28	138
	December	88	72	5	165
	Total	778	1141	296	2215

PURE WELL WATER.

Longstreet's Project for obtaining pure Well-water in Charleston (S. C.) Communicated by Dr. DAVID RAMSAY *to the Editors of the Charleston Telegraph.*

Through the medium of your paper, I beg leave to inform my fellow citizens of the result of an interesting experiment lately made by Mr. William Longstreet. Our knowledge of the interior of the earth on which we tread has been literally superficial. In digging for domestic purposes, we have seldom penetrated more than ten or twelve feet. To go much deeper was generally reputed worse than labour lost, for it always introduced us to bad water. Mr. Longstreet conceived the idea, that by penetrating 40 or 50 feet he would get below the bad water, and find a plentiful supply of a purer fluid than the surface afforded. To bring this theory to the test of experience, he began to dig in a vacant lot in Archdale-street, about two months ago. For the first eleven feet nothing uncommon presented. The next stratum (18 inches)

was a black marsh mud and sand. This suddenly changed to a yellow sand and clay, and continued so for twenty inches; then suddenly resumed the black appearance, and gradually changed to mud. Mr. Longstreet next came to a bed of oyster, clam and conch shells, many of which were entire. This stratum extended three feet. A yellow sand, intermixed with powdered shells, presented next, and continued for two feet. Between the 12th and 20th feet from the surface, muddy brackish water filled the well fast, so as finally to overcome the most strenuous exertions to empty it. This chiefly ascended from the bottom, for effectual precautions were adopted to prevent any quantity of water from entering by the sides. In such a crisis, a mind of less energy than Mr. Longstreet's would have abandoned the project. Instead of this, he replaced a considerable portion of the earth in the well, and, laying aside his spade, drove down a hollow tube of three inches diameter, in the cavity of which a machine for boring was introduced. These were made to penetrate through the earth to the depth of fifty-four feet from the surface. The soil between the 20th and 47th feet was a continued dry, stiff black clay. A sample of this is in my possession, and has been exhibited before the Medical Society. It is of such a consistence as to bear the chissel or plane, and is capable of being cut into any shape. Knives are sharpened by drawing them over its surface, when made smooth. Another stratum of shells presented itself for the next two feet. The black clay then became less rigid, and soon terminated in sand, with little resistance to the operator. On descending two or three feet, the water ascended the tube 48 feet, so as to be only six feet from the surface, and with such rapidity as to yield fifteen gallons in a minute. The joy of the projector on this event may be more easily conceived than expressed. This water, after exposure to the air for a few minutes, resembled common well-water in taste and appearance, and was nearly of the same temperature.

It readily lathered with soap, and gave satisfactory evidence of its being softer than the water in my pump, and also that which is contained in the public pump opposite to the National Bank. Dr. Prioleau and myself applied to different portions of it the following chemical tests: oxalic acid, alkohol of galls, prussiate of lime, oil of vitriol, muriate of barytes, spiritus cornu cervi, and paper stained with a vegetable blue. None of these produced any alteration in the water, from whence we inferred that it was free from lime, iron,

copper, lead, vitriolic acid, or any acid whatever in a separate state.

But on mixing a solution of the nitrate of silver with another portion of the same water, it became white and turbid. This proved the existence of the muriatic acid in combination with some base, which base we had reason to believe was soda; or, in other words, that the water contained a small proportion of common salt. The same test being applied to the rain-water in the cistern of the South-Carolina Bank—to snow-water—to water from Mr. Young's farm, three miles from Charleston—from the spring pump in Trott-street—from the pump opposite to Mr. Strobel's in Meeting-street—and from that which is opposite to the National Bank, they all yielded more or less of the same ingredient. The cistern-water of the South-Carolina bank had the least proportion, and the pump opposite to the National Bank the most. The quantity contained in the intermediate waters was to each other in a relative proportion, as they stand in the above list, to the two extremes. Mr. Longstreet's tube-water contained more than the cistern or snow-water, but less than was detected in either of the pumps before-mentioned.

It is probable that no water near Charleston, in its natural state, is wholly free from common salt. The quantity of it in Mr. Longstreet's tube-water is so inconsiderable as to form no objection against its fitness for domestic purposes. It exists in a greater proportion in the water of the spring pump in Trott-street, which is more generally used than any other in Charleston. Nevertheless, the enterprising projector of the experiment has resolved to penetrate the earth twelve or fifteen feet further, if necessary, with the expectation of procuring water perfectly free from salt.

Mr. Longstreet, impressed with a belief that there is such a similarity of soil in all our low maritime country as to afford the same result to the same experiment, and that the supply of water obtained thereby will be inexhaustible and permanent, intends to extend and vary his researches into the bowels of the earth. If further experiments justify the correctness of his theory, he expects to be able to establish, on any proposed spots, inexhaustible reservoirs of water, each sufficient to furnish all the engines in Charleston, even in the driest seasons, with as much water as they can discharge in case of fire.

2dly. To furnish from any given spot, equal to the area of a circle whose diameter is forty-feet, wholesome water from

a depth that will secure it from all the impurities on the surface of the earth, and in sufficient quantities for the supply of all the families in Charleston.

3dly. To furnish an ample and constant supply of wholesome water for family use, whenever the same may be wanted.

Mr. Longstreet's experiments have already cost one thousand dollars. These observations are volunteered from a conviction that his talents and enterprise merit not only praise, but something more solid, which is as necessary to the philosopher as to all other classes of men. No certain conclusions can yet be drawn of the permanent advantages that may result to the community from the success of a single experiment; but there is good reason to believe that Mr. Longstreet's labours will be far from useless, if his expectations are eventually realised; and it is presumed that he will be remembered by a grateful and obliged community.

NEW NATIONAL DISTINCTIONS.

Proposal to the American literati, and to all the citizens of the United States, to employ the following names and epithets for the country and nation to which they belong; which, at the distance of 27 years from the declaration, and of 20 years from the acknowledgment of their independence, are to this day destitute of proper geographical and political denominations, whereby they may be aptly distinguished from the other regions and people of the earth:

FREDON, the aggregate noun for the whole territory of the United States.

FREDONIA, a noun of the same import, for *rhetorical* and *poetical* use.

FREDONIAN, a *sonorous* name for "a citizen of the United States."

FREDE, a *short* and *colloquial* name for "a citizen of the United States."

FREDISH, an adjective to denote the relations and concerns of the United States.

Example. "FREDON is probably better supplied with the materials of her own history than Britain, France, or any country of the old world: and the reason is obvious; for the attention of the FREDONIANS was much sooner directed, after their settlement, to the collection and preservation of their facts and records, than that of the Dutch and Irish. Hence it will happen that the events of FREDISH history will be more minutely known and better understood than those of Russian,

copper, lead, vitriolic acid, or any acid whatever in a separate state.

But on mixing a solution of the nitrate of silver with another portion of the same water, it became white and turbid. This proved the existence of the muriatic acid in combination with some base, which base we had reason to believe was soda; or, in other words, that the water contained a small proportion of common salt. The same test being applied to the rain-water in the cistern of the South-Carolina Bank—to snow-water—to water from Mr. Young's farm, three miles from Charleston—from the spring pump in Trott-street—from the pump opposite to Mr. Strobel's in Meeting-street—and from that which is opposite to the National Bank, they all yielded more or less of the same ingredient. The cistern-water of the South-Carolina bank had the least proportion, and the pump opposite to the National Bank the most. The quantity contained in the intermediate waters was to each other in a relative proportion, as they stand in the above list, to the two extremes. Mr. Longstreet's tube-water contained more than the cistern or snow-water, but less than was detected in either of the pumps before-mentioned.

It is probable that no water near Charleston, in its natural state, is wholly free from common salt. The quantity of it in Mr. Longstreet's tube-water is so inconsiderable as to form no objection against its fitness for domestic purposes. It exists in a greater proportion in the water of the spring pump in Trott-street, which is more generally used than any other in Charleston. Nevertheless, the enterprising projector of the experiment has resolved to penetrate the earth twelve or fifteen feet further, if necessary, with the expectation of procuring water perfectly free from salt.

Mr. Longstreet, impressed with a belief that there is such a similarity of soil in all our low maritime country as to afford the same result to the same experiment, and that the supply of water obtained thereby will be inexhaustible and permanent, intends to extend and vary his researches into the bowels of the earth. If further experiments justify the correctness of his theory, he expects to be able to establish, on any proposed spots, inexhaustible reservoirs of water, each sufficient to furnish all the engines in Charleston, even in the driest seasons, with as much water as they can discharge in case of fire.

2dly. To furnish from any given spot, equal to the area of a circle whose diameter is forty-feet, wholesome water from

a depth that will secure it from all the impurities on the surface of the earth, and in sufficient quantities for the supply of all the families in Charleston.

3dly. To furnish an ample and constant supply of wholesome water for family use, whenever the same may be wanted.

Mr. Longstreet's experiments have already cost one thousand dollars. These observations are volunteered from a conviction that his talents and enterprise merit not only praise, but something more solid, which is as necessary to the philosopher as to all other classes of men. No certain conclusions can yet be drawn of the permanent advantages that may result to the community from the success of a single experiment; but there is good reason to believe that Mr. Longstreet's labours will be far from useless, if his expectations are eventually realised; and it is presumed that he will be remembered by a grateful and obliged community.

NEW NATIONAL DISTINCTIONS.

Proposal to the American literati, and to all the citizens of the United States, to employ the following names and epithets for the country and nation to which they belong; which, at the distance of 27 years from the declaration, and of 20 years from the acknowledgment of their independence, are to this day destitute of proper geographical and political denominations, whereby they may be aptly distinguished from the other regions and people of the earth:

FREDON, the aggregate noun for the whole territory of the United States.

FREDONIA, a noun of the same import, for *rhetorical* and *poetical* use.

FREDONIAN, a *sonorous* name for "a citizen of the United States."

FREDE, a *short* and *colloquial* name for "a citizen of the United States."

FREDISH, an adjective to denote the relations and concerns of the United States.

Example. "FREDON is probably better supplied with the materials of her own history than Britain, France, or any country of the old world: and the reason is obvious; for the attention of the FREDONIANS was much sooner directed, after their settlement, to the collection and preservation of their facts and records, than that of the Dutch and Irish. Hence it will happen that the events of FREDISH history will be more minutely known and better understood than those of Russian,

Turkish or Arabic. And thereby the time will be noted carefully, when a native of this land, on being asked who he is, and whence he came, began to answer, in one word, that he was a FREDE, instead of using the tedious circumlocution, that he was "a citizen of the United States of America." And in like manner notice will be taken of the association of FREDONIA with Macedonia and Caledonia, as a word equally potent and melodious in sound."

FOREIGN.

TWO KINDS OF ELECTRICITY.

MR. CUTHBERTSON gives the following account of an experiment by which the two kinds of electricity are distinguished, or the direction of the fluid is ascertained:—Insulate two wires, furnished at each end with a ball, three-fourths of an inch in diameter; connect one with the positive, and the other with the negative, conductor of a machine; the balls should be four inches asunder, and between them, at equal distances from each place, a lighted candle, with the center of its flame nearly on a level with the centers of the balls; if the machine be put into motion, the flame will waver very much, and seem to incline rather more to the negative ball than to the positive one; after about fifty revolutions, the negative ball will grow warm, and the positive ball remain cold; if the revolution be continued to about 202, the negative ball will be too hot for the hand to touch, while the other remains as cold as at the beginning. [*Month. Mag. Dec.* 1802.

PROCESS FOR COPYING MANUSCRIPTS.

Citizen Coquebert has lately communicated to the Philomathic Society of Paris, a very simple process for taking a copy of a recent manuscript. The process is the more interesting, as it requires neither machine nor preparation, and may be employed in any situation. It consists in putting a little sugar into common writing ink, and with this the writing is executed upon common paper, sized as usual: when a copy is required, *unsized* paper is taken, and lightly moistened with a sponge. The wet paper is then applied to the writing, and a flat-iron (such as is used by laundresses) of a moderate heat, being lightly passed over the unsized paper, the copy is immediately produced. [*Ibid.*

LIGHT AND HEAT NOT THE SAME.

Citizen Pictet gives an account of experiments to prove, that light and heat are *not* the same. Opposite to each other he places two concave metallic mirrors; in the focus of one he places a lighted candle, and in the focus of the other a very sensible air-thermometer: he then places between the foci a piece of very thin and transparent glass; the thermometer indicating the transmission of heat, stopped that instant. The two mirrors were placed at the distance of about twenty-five yards one from the other, in order to determine whether the time of the propagation of the radiant heat, from one focus to the other, could be appreciated. A heated, but not luminous ball, was suspended at one of the foci, before which a screen was placed. At the instant that this obstacle was removed, the fluid in the thermometer, which was before perfectly at rest, began to move, and no sensible interval could be perceived between the suppression and the effects of the transmission of heat. [*Ibid.*

GALVANISM.

M. Aldini, Professor at the Institute of Bologna, and nephew of the celebrated Galvani, has visited this metropolis, and given an accurate account of his experiments and discoveries to the Royal Society, before whom the same was read on the 25th ult. (Dec. 1802.) By the various experiments exhibited by this gentleman, both at London and Oxford, he has established the fact, that Galvanism is animal electricity, not merely passive, but probably performing the most important functions in the animal economy. A series of experiments made by this learned Professor shows the eminent and superior power of Galvanism, beyond that of any other stimulant in nature; and it is hoped that it may be applied for the benefit of mankind in disorders of the head, and in apoplexies. Galvanism has been successfully applied in melancholic insanity. Two persons have been cured by it at Bologna. [*Ibid. Jan.* 1803.

Professor Aldini availed himself of the opportunity afforded by the execution of Forster, on Monday, the 17th of January, 1803, for the murder of his wife and child, to repeat his experiments on the theory of his uncle Galvani. A liberal offer had been made him of the use of that subject, by Mr. Keate, surgeon to the King, who was himself present on this occasion. The result of this experiment promises the greatest advantages to the interests of humanity, especially in cases of apparent death by drowning, and other cases of as-

phyxia. These gentlemen, we understand, found that the corpse, by means of Galvanism, was made to exhibit very powerful muscular contractions before dissection, and that afterwards these contractions continued for seven hours and an half. On the first application of the process to the face, the jaw of the deceased criminal began to quiver, and the adjoining muscles were horribly contorted, and one eye was actually opened. In the subsequent part of the process, the right hand was raised and clenched, and the legs and thighs were set in motion. It appeared, to the uninformed part of the bye-standers, as if the wretched man was on the eve of being restored to life. These facts, which were hitherto unknown, will serve to illustrate the physiology, and the theory of Galvanism, a science which owes the highest obligations to Professor Aldini, who has already exhibited his experiments at Oxford, at Mr. Wilson's Anatomical Theatre in London, and at St. Thomas's and Guy's Hospitals. We learn with pleasure, that the lecturers and pupils of these two hospitals have presented Professor Aldini with a gold medal, in honourable testimony of their approbation.

M. Circaud has recited, in a letter to Delametherie, the results of some Galvanic experiments, which, if correct, will doubtless lead to many important discoveries in animal physiology. The ancient, and now almost exploded, doctrine of the vitality of the blood, and the independence of the vital on the sentient principle, appears to have acquired a high degree of probability by M. Circaud's experiments; the minute particulars of which we shall pass over, confining ourselves to the general result. This is, that the blood drawn from the veins or arteries of an ox, which has just been knocked down, and agitated for a minute or two till coagulation takes place, is susceptible to Galvanic stimuli; as appears from the contractions that take place in the clot thus formed when made to communicate in the usual manner with the Galvanic pile. The coagulum continued to possess this property for about forty minutes, or till it had cooled down to nearly the atmospheric temperature. During the latter part of this period, the contractions having become very feeble, were increased by the affusion of fresh warm blood, or by immersing the clot in the same. A solution of muriate of ammonia had no effect in exciting or increasing the contractions. Hence it appears, that sensibility to Galvanic stimuli is a property of muscular fibre wholly independent on the nerves; and, therefore, not in the least indicative of sensation. [*Ibid. Feb.* 1803.

From the late important and striking experiments in Galvanism, it appears, 1. That, taking the cessation of excitability to the Galvanic stimulus as the criterion of life, the heart is not the *ultimum*, but the *primum moriens*; for, while the muscles of the limbs were excited to strong contractions, for even several hours after apparent death, the heart was utterly incapable of being excited to action, either by applying the extremity of the metallic arc to the surface, or to the interior of this organ. 2. That the lungs were equally inexcitable as the heart. 3. Not only were the muscles, but the skin and cellular membrane, excited by the Galvanic stimulus. 4. The contractions of the muscles were excited by the metallic arc, applied to the nerves supplying the muscles; but the nerves themselves were not affected. 5. The raising up of the arm was produced, as if by volition, by the Galvanic stimulus. 6. A milky or coagulated matter was formed by repeated contractions of the muscle in contact with the copper wire. 7. When the parts ceased to give out motion, the motion was renewed with augmented force, by wetting them with a solution of sal-ammoniac.

In attempting to restore suspended animation by means of the galvanic stimulus, it is recommended that oxygen gas should at the same time be applied to the lungs.

Mr. Cuthbertson has constructed an instrument by which the Galvanic fluid may be applied effectually, for any length of time, without manual assistance, and will, without doubt, hereafter, be as commonly used as our present electrical machines.

In comparing electricity with Galvanism, it must be observed that the former acts by its intensity, and the latter by its quantity; that the former is sometimes intense enough to strike a man down, and yet not in quantity sufficient to melt a small wire; but the latter will melt metals, and yet scarcely produce a shock.

Mr. Strenger, of Iver, administers the Galvanic influence, in cases of deafness, by applying a small ball to the external orifice of the ear, while a much larger one is held in the patient's hand; the communication is then formed and interrupted alternately, by means of machinery, once in every second, for about four minutes daily, for two or three weeks. He asserts that he has thus restored the sense of hearing to 45 persons. [*Ibid. March*, 1803.

Some curious Galvanic experiments were made lately by Professor Aldini, in Dr. Pearson's lecture-rooms. They were by far more interesting and satisfactory than any we have

yet noticed, owing to the pains to procure the fittest subjects for the operations. They were instituted in the presence of Gen. Andreossi, Lord Pelham, Duke of Roxburgh, Lord Castlereagh, Lord Hervey, the Hon. Mr. Upton, Mr. Cholmondely, Mr. Anchorn, Mr. Elliot, and several other gentlemen of rank. The Professor was assisted ably, as on former occasions, by Mr. Carpue, Mr. Cuthberston, and Mr. Hutchins.

Among other important facts, it was decisively shown,

1. That a vital attraction subsists between a nerve and muscle; for the suspended sciatic nerves of a frog, after detaching the spine, being brought near the intercostal muscles of a dog, while the assistant who held the frog did, with his other hand, touch the muscles of the thigh of the dog (thus forming a circle): in this situation, the nerves suspended approached, and came into contact with the muscle, as evidently as a silken thread is attracted by sealing-wax.

2. The heart of a rabbit was excited to action in a little time after the animal was killed, but vitality disappeared much sooner than in the other muscles, so that this organ is the *primum*, and not, as Harvey asserted, the *ultimum moriens*. The lungs, liver and spleen, could not be excited to action, even immediately after the animal was killed.

3. The most important fact of all was that of exciting contractions by making a circle of nerves and muscles of different animals, without any metallic excitor or conductors.

4. The head of an ox, recently decapitated, exhibited astonishing effects: for the tongue being drawn out by a hook fixed into it, on applying the exciters, in spite of the strength of the assistant, the tongue was retracted, so as to detach itself, by tearing itself from the hook: at the same time a loud noise issued from the mouth by the absorption of air, attended by violent contortions of the whole head and eyes.

[*London Paper.*

OXYGENATED MURIATIC ACID GAS.

Cit. Potel has discovered that oxygenated muriatic acid gas may be employed with the greatest advantage in all cases of *asphyxia*. Several rats, which had been found drowned, being placed within the action of some of this gas, were speedily resuscitated: he repeated the experiment on the same rats, and on several cats, with equal success: he even made some experiments on himself, which were crowned with success. The Academy of Dijon has appointed commissioners to ascertain the property of this gas in cases of apparent sudden death. [*Month. Mag. Jan.* 1803.

NITRIC ETHER.

A new method has been discovered, by M. Brugnatelli, of expeditiously obtaining nitric ether by distillation, without external heat: it is thus procured:—Into a tubulated retort is introduced one ounce of sugar, and two ounces of pure alkohol are poured upon it. To the retort is adapted a capacious receiver, enveloped with a cloth dipped in cold water, and the joinings are secured with a single slip of paper. Upon this matter, three ounces of highly-concentrated and smoking nitric acid are poured through the tube of the retort. An effervescence instantly takes place, the mass becomes heated, the sugar is dissolved, ebullition ensues, and the alkohol is etherised, and passes from the retort to the receiver. Thus, in a little time, all the alkohol, converted into excellent ether, of a light orange-colour, and a very agreeable smell, may be collected in the receiver. After the formation of the ether, a small quantity of nitrous gas is disengaged in the operation, which may be discovered by a red vapour. At this moment the receiver should be changed. The residue of the sugar may be readily converted into oxalic acid, by treating it with a fresh quantity of nitric acid.

The same chemist has succeeded in turning oil, in an almost rancid state, into wax. To two parts of oil pour one of alkohol, and then another part of nitric acid. The alkohol was converted into ether. The oil, after growing cold, and standing undisturbed twelve hours, was found changed into a yellowish white substance, coagulated in a single mass, insipid, without smell, and of the nature of wax. [*Ib. Feb.* 1803.

NEW METAL.

M. Ekeberg, an eminent Swedish chemist and mineralogist, has discovered a metallic substance, which he considers as possessed of peculiar properties, and therefore new. He calls it *tantale*. There are two forms under which it occurs in nature; the one is the native oxyd of tantale, formerly taken for an oxyd of tin, and, therefore, called by the Germans *zinn graupen*, but which is now denominated by M. Ekeberg, tantale. The second is the metallic oxyd, in mixture or combination with the earth *yttria*; hence it is called *yttrotantale*. This species is found in Ytterby, in Finland, in granite, dispersed in small nodules about the size of a nut. The circumstances that distinguish the tantale from other metals are, 1. It is absolutely insoluble in acids. 2. It is attacked and taken up by alkalies in considerable quantities, and without much dif-

ficulty; and is precipitated from its alkaline solutions by the addition of an acid. 3. The colour of the oxyd is white, and does not alter by exposure to fire. 4. Its sp. gr. after having been made red-hot, is=6.5. 5. It melts with phosphat of soda and borax into a colourless glass. 6. When strongly heated with charcoal powder, it agglutinates, and assumes a metallic aspect. The two ores of this mineral being by no means unfrequent in Sweden, it is to be hoped that M. Ekeberg will repeat and renew his experiments on this substance, that its properties and relations may be more fully known.

[*Ibid.*

VEGETABLE IRRITABILITY.

The sensibility with which certain plants appear to be endowed, is it purely mechanical, or has it any analogy with animal sensibility? This question of vegetable physiology has been the object of a memoir of Cit. Dutrouil, member of the Society of Science, &c. of Bordeaux. The author first defines the signification of animal irritability; he next examines how far the movements that are perceived in certain plants, when placed in contact with a foreign body, are the indices of an irritability of this kind; he discovers the cause of these movements in the organization of the plant, and explains them in a manner purely mechanical. The author pays particular attention to the sensitive plant: he attributes the movement which it makes, when touched with the finger, to the action of the electric fluid, and to the sudden disengagement which is produced when put in equilibrium. He confirms this explication, by observing, that if the plant be touched with a body which is not proper to transmit the electric fluid, this movement will not take place. Light produces the same effect on the plant as the contact of the finger, by reason of the electricity which is demonstrated to be contained in that agent. The author afterwards attacks the consequence that certain naturalists draw from the approximation of certain parts of the plant at the period of fecundation (namely, that they are endowed with a certain sensibility), by assigning to this approximation a cause purely mechanical; he does not admit in plants the faculty of perception, except it be that of feeling; and he grounds his opinion on the little analogy that there is between their organization and that of the beings in which this faculty exists, and which they only owe to it.

[*Ibid. March*, 1803.

Investigation of the History of Cancer, in a Letter from Dr. Denman (of London) to Dr. Mitchill.

SIR,

I am directed by the committee to send you the papers relating to the society for investigating the nature and cure of cancer. From your known abilities and eminence, the society hopes much useful information respecting that disease may be derived.

I remain, with great respect,

Sir,

Your most humble servant,

THOMAS DENMAN.

Old Burlington-street (London), Jan. 27, 1803.

Dr. MITCHILL, *Member of Congress, New-York.*

Copy of the Minutes of the Committee of Superintendance of the Institution for investigating the Nature and Cure of Cancer, &c. Held January 1, 1803.

Mr. Aisley laid before the committee a specimen of a plant with which the North-American Indians are said to cure cancer.

Resolved, That Mr. Aisley be requested to give the thanks of the committee to Mr. Rapalje, the gentleman who supplied the specimen, and that the plant be referred to the medical committee.

The American consul, Mr. Erving, having been pleased to send a paper, containing a case of supposed cancer, which was cured by a certain application, which paper was extracted from an American Magazine;

Resolved, That the thanks of this committee be given to Mr. Erving for his communication, and that the paper be referred to the medical committee.

Dr. Mitchill, member of Congress for New-York, was immediately and unanimously elected a corresponding member of this institution.

Resolved, That Thomas Bernard, Esq. be requested to desire Mr. Erving to take the trouble of sending a copy of these minutes, and the papers relating to this institution, to Dr. Mitchill, at New-York.

THOMAS DENMAN, *Secretary*,

For the Hon. CROPLEY ASHLEY, *Chairman.*

At a Meeting of the Medical Committee of the Institution for investigating the Nature and Cure of Cancer, March 19, 1802;

PRESENT,

Dr. BAILLIE in the Chair.

WILLIAM SHARPE, Esq.	Dr. SIMS,
EVERARD HOME, Esq.	J. ABERNETHY, Esq.
JOHN PEARSON, Esq.	Dr. WILLAN.

Resolved, That the queries which have been sent to the members of this committee be now taken into consideration.

The said queries having been read and approved, it was resolved that they be printed, and copies of them sent to each of the corresponding members.

QUERIES.

1. What are the diagnostic signs of a cancer?

2. Does any alteration take place in the structure of a part, preceding that more obvious change which is called cancer? If there does, what is the nature of that alteration?

3. Is cancer always an original and primary disease, or may other diseases degenerate into cancer?

4. Are there any proofs of cancer being an hereditary disease?

5. Are there any proofs of cancer being a contagious disease?

6. Is there any well-marked relation between cancer and other diseases? If there be, what are those diseases to which it bears the nearest resemblance, in its origin, progress and termination?

7. May cancer be regarded at any period, or under any circumstances, merely as a local disease? Or does the existence of cancer in one part afford a presumption that there is a tendency to a similar morbid alteration in other parts of the animal system?

8. Has climate or local situation any influence in rendering the human constitution more or less liable to cancer, under any form, or in any part?

9. Is there any particular temperament of body more liable to be affected with cancer than others? And if there be, what is that temperament?

10. Are brute creatures subject to any disease resembling cancer in the human subject?

11. Is there any period of life absolutely exempt from the attack of this disease?

12. Are the lymphatic glands ever affected primarily in cancer?

13. Is cancer, under any circumstances, susceptible of a natural cure?

Adjourned.

M. BAILLIE.

THOMAS DENMAN, *Secretary.*

APPENDIX.

ARTICLE I.

Report *to* Congress *on* Quarantine Regulations.

In the House of Representatives, Feb. 25, 1803, *Dr. Mitchill offered the Report of the Committee to whom was referred the Resolution of the House of the* 15*th inst.*—"*That Provision ought to be made by Law for the Regulation of Quarantine within the District of Columbia.*" (See the Essay on Lazarettoes in Med. Rep. vol. v. p. 243.)

THE term quarantine has been used, in the commercial world, to denote the detention of a ship or vessel at a convenient place, some distance from port, for the space of forty days, for the purpose of freeing her from contagion and infection, supposed to have been transported in her from foreign places. Latterly it means any shorter number of days. Under the persuasion that their own cities and habitations were exempt from such contagion and infection, and that these destructive agents were always introduced from remote places, less salubrious than their own, mankind have taken great pains to protect themselves from external attacks of the distempers which they believed to be prevalent among their neighbours or strangers. By the presumption that contagion was frequent in many foreign settlements, and was readily transported from country to country by commercial communications, have the nations of the earth been influenced in framing the rules and the means of restraint imposed upon their mutual intercourse. They have often looked upon each other as lazars or lepers, and treated visitors and passengers, at certain seasons, as such.

The importance of the subject, as well to the commerce and revenue of the United States as to the happiness and security of her citizens, has induced your committee to look into it carefully. They have endeavoured to gather facts, and to deduce therefrom correct conclusions. And upon the most complete investigation which they have been able to give the subject, they are decidedly of opinion that the ideas generally entertained concerning quarantines are very erroneous.

It is true that certain diseases which afflict mankind, such as small-pox, for example, may be transferred from one per-

son to another. But, of late, doubts have been entertained in the minds of some of the best observers, of such as have had great opportunities of knowing and judging, whether the like contagiousness is true of yellow fever, and the fever infesting ships.

Sickness of distant places, and the danger arising from any intercourse with them, is one of the trite themes of remark almost every where. At the same time few people can be brought to acknowledge the noxiousness of the soil and atmosphere of the place of their permanent residence. Therefore the inhabitants of the West-India islands are positive that they import yellow fever from Boston, New-York, Philadelphia and Baltimore; while the inhabitants of those cities, respectively, have been quite as decided in their conviction that the same distemper is brought to them from Cape-François, Kingston, Havanna, and Demerara. Both sides are equally positive, and both about equally wrong. During the 700 or 800 years, since the days of the crusades, these erroneous sentiments have been indulged in Christendom. Great embarrassments have been experienced from them; and at this day they seem to be increasing. It is an object worthy the attention of the National Legislature, to correct within these States this growing evil.

It is apparent to your committee, that most, if not all, the infectious diseases which at times afflict the crews of sea-vessels, arise, *not* from the ports or countries they have visited, but from causes which exist *within the vessel.* Human beings, inhabiting such crowded situations, engender and communicate diseases, which increase in frequency and malignity by sloth and uncleanness.—Now, a ship is a human habitation, and sometimes the crew is very numerous, and usually prone to grow unclean. Frequently this uncleanness accumulates to a disgusting degree, and turns to poison. The poison stirs up pestilence. Arrivals from Europe have given recent and woeful proofs of this.

But a ship is not merely a human dwelling; she is also a magazine or store-house. Within her sides, as in a common receptacle, are collected many sorts of things prone to perish and corrupt. Beef, fish, pork, hides, and other animal substances, frequently taint the hold that contains them with their deleterious vapours. This tendency to putrefy is often increased by the scanty quantity and weak quality of the Liverpool salt with which they are put up. Their provision spoiling during the West-India voyages, and rotting on ship-board

(which is a well-known case in hot climates), render the berths and quarters of the men unhealthy. The crew sickens from the operation of such mischievous agents, and some of them are soon destroyed. The evil is increased when they are obliged to feed upon such tainted or spoiled meat as a part of a daily ration. Not only animal substances, but onions, coffee, Indian corn, and various other vegetables, which are transported from country to country, contribute, by their occasional decay, to render unhealthy the bottoms in which they are carried. From these causes it is well known that provision carried between our ports and the southern islands degenerate; and frequently the vessels conveying them are found in a very filthy and unclean condition. From the corruption of their cargoes, and the uncleanliness of the crews, ships may be filled with a venomous atmosphere, and the timbers, planks, bedding, &c. be charged or impregnated with the inbred mischief. Many ships belonging to the United States afford instructive examples of fevers caused on board, by the exhalations from putrid provisions, on their outward-bound voyages. A corrupting barrel of beef has done great injury within a vessel sailing from Great-Britain to the United States.

It is a remarkable fact, that ships and vessels, though so prone to become foul and pestilential, are seldom cleansed in so complete a manner as they ought to be. From the time that they are launched to the day of their condemnation, few or none of them are perfectly purified. Year after year this foulness increases, insomuch that old ships and vessels are usually the most nasty and loathsome of human habitations.

Ships being thus, from their structure, tenants and cargoes, peculiarly liable to accumulate poison, and being rarely or never cleared out as they ought to be, carry that infectious matter, engendered within them, to all parts of the world. And by a curious and unhappy mistake, the pestilence produced in one of these floating mansions has been almost always ascribed to the place from which she last came, though that place commonly has not had any kind of agency in the matter.

Hence it will appear to every reflecting mind, that the common mode of quarantine, by detaining a foul ship at anchor, will rather increase than remedy the evil intended to be guarded against. Bills of health are nugatory or deceitful; for if a clean ship sails from a sickly place, a foul bill of health will not really indicate an unfavourable state of health on board, nor prove the crew to be infected with the distemper

that prevails in the port she left; nor will a clean bill prove that the people in a pestilential vessel are in good health, or that she is in a safe or fitting condition to be admitted to port: consequently bills of health are either useless, or worse than nothing. With the Dutch, who are remarkable for clean ships, and who carry the system of purification on board their vessels to a greater extent than any other nation of Europe, quarantine is a mere form only. Pestilence can neither be bred nor continued on board the vessels of the Hollanders.

Instead of the rigorous rules of quarantine adopted in the United States, your committee are of opinion, the mischiefs intended to be guarded against thereby might be more effectually prevented by less injurious means. It is remarkable how little pains are usually taken to accomplish the complete and healthy purification of ships. None of the regulations which have hitherto been made direct the method of performing it, or insist upon it with sufficient energy. A ship cannot be deemed wholesome and fit for a voyage merely because the hold and windows have been opened after she is unladed, her decks washed and scraped, and the bilge-water pumped out. Nor will the smoking her out with brimstone, tar, or nitrous and muriatic vapours, render her a suitable habitation to preserve the health and lives of men. As well might it be pretended, that infected rooms, beds and clothes could be purified merely by letting in the air, and setting fumigating mixtures into action; when all domestic experience teaches that *soap*, *ley* and *lime*, are the only sure and efficacious auxiliaries in all cases of difficulty and danger.

It is a lamentable fact, that under the present quarantine regulations, in most places, so little regard is paid to cleaning a fœtid and infectious ship. Provided she does not transgress the rules *of the port where she happens to be*, by proceeding beyond her prescribed limits, she may, nevertheless, weigh anchor, and go in her foul condition to *any other port or city*, without the least impediment. By this miserable practice is the poison of plague, pestilence, or yellow fever, produced, continued and multiplied, by natural and necessary process on ship-board, and carried to all the places she visits. And while this dreadful custom prevails, there will not probably be an end of the rumours of imported contagion, and all the consequent terror and stagnation of business at home, and of detention of ships and expense of quarantine abroad. The recent accounts of the severe quarantine of an hundred days and more, imposed upon American vessels in some of the

principal ports of Spain, must fill every friend of our commerce with regret. It amounts to an almost total prohibition of our trade with those cities, and is viewed by your committee as countenanced by the false alarms and unfounded suggestions prevalent among our own citizens. In order to prevent these commercial restraints in some degree, it is necessary to form our health-laws upon more scientific principles, and to regulate our marine and naval intercourse upon maxims more accordant with the means of preserving domestic neatness and household purity on shore.

Considering the great influence of names over human thought and action, and the high importance of a correct nomenclature for legal and scientific purposes, it were to be wished that the term quarantine should be erased from the statute books of the union, and of each particular State. Instead of ordering a vessel to *perform a quarantine*, she ought to be *simply directed to be made clean*. Such foul and infectious vessels, with sickly crews, should be prevented from coming to our cities, or proceeding on any voyage in that situation. Nor is the matter so difficult of execution as many have imagined. When a vessel arrives from any foreign port, let her come to at some convenient place. If any are sick on board, let them be landed, and all uncleanness be put away. If she has any spoiled and putrefied provisions or merchandize on board, let them be also taken out. Then cause her to be scoured and cleansed in every part with pure water, *soap*, *sand*, *alkaline ley*, *lime*, and other sweetening and purifying substances; after which the admission of a plenty of clean and good air will complete the work. These are the methods we use with success to cleanse our habitations on the land. They are equally applicable to habitations on the water. And it is necessary to scour the latter as frequently and as thoroughly as the former. But as individuals who own and navigate vessels are too careless or forgetful to cause them to be frequently and efficaciously cleansed, there is a necessity for public authority to interfere. This interference should be exerted to purify every foul and pestilential vessel that enters a port, and not keep her idly and injuriously riding at anchor. Quarantines may be thus shortened from forty days to less than *forty* hours. *Indeed, they would be nothing more than a thorough ship-cleaning.*

When the civilized world shall, with one accord, enforce the regular and exact purification of ships, there will be nothing on board to turn to pestilential or any other fever-pro-

ducing agent. And all the inquiry necessary, when a vessel arrives, will be, whether she is clean or dirty. As the latter is almost always the fact, she should be cleansed by public authority, and never suffered to go to sea, no more than enter a port, in a foul internal condition. There would then be no vessels afloat carrying infection within them from place to place, and the tales about contagion from foreign ports would gradually die away, and cease to agitate society, as they now do, to the great detriment of our trade, and disgrace of commerce, medicine and police.

After taking this comprehensive view of the subject, it would have been pleasing to the committee to have proposed something more in detail for the treatment of vessels arriving at the port of Alexandria conformably to these principles; but the advanced period of the session prevents their offering any thing further for the consideration of the house at this time. They content themselves, therefore, for the present, with calling attention to this important subject, and presenting for adoption, as a temporary expedient, a bill for extending the quarantine laws of Virginia to the territory of Columbia.

ARTICLE II.

ADDRESS *from the* AMERICAN BOARD *of* AGRICULTURE *to the* CITIZENS *of the* UNITED STATES.

OF the vast variety of objects to which the energies of the human mind have been directed in the extensive range of science, there is none which merits so much, and which receives so little encouragement from the exertions of the learned as the subject of agriculture. Whether this is attributable to the natural indolence of man, which shrinks from the efforts necessary to extract the useful and the meritorious from the mass of indigested materials which the world presents; or whether the pride of learning disdains to stoop to the scrutiny of objects equally open and intelligible to the informed and the ignorant, the fact remains the same; and the benefits which would result from the adoption of means to collect and distribute such ideas, essays and experiments, as would have a tendency to improve the agricultural and economical arrangements of the nation, is equally demonstrable.

Institutions, in the nature of societies established in other countries, in which theories and facts relating to this important

subject are received, considered and divulged, and from many of which great good has arisen, show to us experimentally the advantages we are to expect from the establishment of similar institutions here. Partial associations of this kind have already taken place in some parts of the United States; but the field which they embrace, being relatively circumscribed, and no channel of communication and interchange having been hitherto opened, a small portion of the community only have derived advantage from their labours. A remedy to this inconvenience is desirable—and a remedy is attempted. Some gentlemen who are impressed with the practicability of drawing the scattered light on this subject to a focus, and so directing it as to give it a benignant influence, have laid the foundation for establishing a *National Board of Agriculture*. Its progress and its utility will depend on the ardour with which the objects it points to are pursued. Every attempt of this sort will be abortive, every effort nugatory, which is not supported by the aid and co-operation of intelligent practical agriculturists. The assistance of these in every part of the nation is solicited, as is likewise the aid of such societies as have been already established. Some of the most prominent objects, in the opinion of the board, to which the views of those should be directed who feel disposed to support and encourage the views of the establishment, and on which they feel most solicitous for early information, are the following:

1. Details of the valuable improvements which have taken place in machinery, implements of husbandry, and rural economy in general, within the limits of each State.

2. A list and actual communication of such publications as have taken place on this subject in each State; calendars, pamphlets, speculative and practical essays, &c. from the earliest times.

3. Communications relating to, or embracing subjects of agriculture, domestic and rural economy, and mechanics, so far as they may be applied to any of the above subjects, or to manufactures.

4. Speculative and experimental essays on any subject connected with agriculture and domestic manufactures, or tending to throw light on, or improve any particular branch of either.

5. The history of the progress of agriculture from the first settlement of each State to the present time.

6. The present staple articles of cultivation, mode of culture, and average product, within certain described geographi-

cal limits, with an account of the different species and varieties of such articles.

7. Lists and descriptions of implements of husbandry now in use in various parts of the United States, or in any particular State.

8. Lists and descriptions of the different trees, shrubs and plants, natural and exotic, now growing in the United States, with accounts of their qualities, properties and uses; the probable benefit which would result from introducing new described subjects of culture; and the method of raising, treating, and improving plantations, orchards and vineyards.

9. Names and descriptions of the various kinds of grapes, natural and cultivated, now used; with the method of raising, curing, preserving and sending them away, in different parts of the United States.

10. State of enclosures and fencing. Method, materials and cost of making and raising them.

11. The best method of treating, and schemes for improving exhausted soils.

12. Analytical accounts of different manures now used, or which may probably be successfully introduced into the United States, or any part thereof, with the causes of their operations and effects upon vegetables.

13. Improvements which have taken place, and schemes for improving live-stock of every description; and accounts of the introduction and the changes any of the domestic animals have undergone.

14. Plans for buildings of all kinds, having any relation to husbandry or manufactures, or any branch of either; with descriptions of the materials to be used in erecting them, and estimates of the expense.

15. The best method of making and improving roads, and estimates of the expenses.

Whatever will throw light on the history of the agriculture and manufactures of this country; whatever will have a tendency to meliorate the soil, increase the productions, and lessen labour, will be acceptable to the Society. The objects within the pale of this institution are so numerous and diversified, that in an invitation like the present, it will be impossible to designate each particular subject on which it is desirous of information; much therefore will be left to the discretion of those who feel a disposition to promote the views and intentions of the board, by imparting the result of their reflection and experience. Towards those who may think proper to

communicate information, the utmost delicacy and decorum will be observed; for whilst the Society reserves to itself the right of making such selections, and promulgating such communications as seem to be best calculated to promote the general good, it will carefully avoid inflicting a wound on the feelings of any correspondent.

The establishment of an extensive Agricultural Museum is another object which seems to promise advantage to the community. A country such as the United States, comprehending an extent of territory, a diversity of soil, and a variety of productions almost unequalled by any other, is peculiarly adapted for commencing the experiment of collecting into one general repository, specimens of whatever may be converted to the useful purposes of man, under the operations and industry of the husbandman and the manufacturer. Whatever the bounty of nature has bestowed upon our country, or whatever the ingenuity of man has contrived as applicable to the views of this institution, might, by right means, be brought into such a compass, as to exhibit to the eye, in one view, the wonderful variety of subjects from which all our necessary and habitual wants are supplied. At the same time that the curious would be gratified in viewing a collection, so novel and so interesting, the more useful classes of society, the husbandman and manufacturer, would derive the most necessary and useful instruction from the same source. Agriculturists of the north and of the south, of the east and of the west, would have an opportunity of meeting upon central ground, and of judging of the propriety of transplanting such vegetable productions as might flourish and become profitable in the different quarters of the nation: in a great variety of instances, a similarity of soil, and a favourableness of situation, would overcome the difficulties to which a diversity of climate frequently gives rise. Manufacturers of every description would behold a variety of mechanism, many of the principles of which would be applied to purposes to which the idea and imagination of the inventors had never extended. The benefits which would result from depositing models of useful implements in this Museum, would be by no means exclusive to husbandmen and manufacturers: on the contrary, they would be reciprocal between the *inventor* and the *user*; for at the same time that the proposed repository would be accessible to all those who should be desirous of adding to, or improving their necessary implements and utensils, an opportunity would be afforded to the inventor of placing his model in a point of view so conspicuous as would soon bring it to that test

of experience which would determine its merit and general utility.

Under impressions like these, the board have determined to afford a place of deposit for such specimens, delineations, descriptions and models as may be connected with the general design of the institution. The three following heads will comprehend many of the subjects, to which they invite the attention, and solicit the aid of such ingenious persons as may be disposed to favour their establishment

1. Preserved specimens of such rare trees, shrubs and plants, or parts of them, as are useful, or as may be applied to the purposes of agriculture or domestic manufactures.

2. Specimens of such earths, fossils and minerals, as may be used as manures or preservatives in any way, or as are in any manner applicable to either of the above subjects.

3. Models of implements of every description now in use, or which may be beneficially applied in any of the branches of agriculture or domestic manufactures.

A receptacle for them will be provided so soon as the convenience of the board will admit; in the mean time communications will be received by any member of the committee of correspondence.

Published by order of the American Board of Agriculture.

ISAAC BRIGGS, *Secretary.*

Washington, Feb. 22, 1803.

ARTICLE III.

Biographical Memoirs *of the late Dr.* Darwin.

ERASMUS DARWIN, the seventh child and fourth son of Robert Darwin, Esq. was born at Elston, near Newark, in Nottinghamshire, on the 12th of December, 1731: he received his early education at Chesterfield-school, under the Reverend Mr. Burrows, of whom he always spoke with great respect. He was entered, with two of his elder brothers, at St. John's College, Cambridge; and, being intended for the practice of medicine, took the degree of M. B. in 1755, defending, in his *thesis*, an opinion, that the motion of the heart and arteries is produced by the immediate stimulus of the blood. During his residence at Cambridge, Mr. Darwin was elected to one of Lord Exeter's scholar-ships, worth about

£16. per annum, which, from the meagreness of his father's income at that time, was esteemed a desirable acquisition. After having prepared himself for his future profession, by an attendance on the Lectures of Dr. Hunter, in London, and by a severe course of study at Edinburgh, he contemplated the metropolis as the proper theatre for his exertions. Deterred, however, by the want of an immediate introduction, and the improbability of obtaining immediate patronage, Dr. Darwin thought it altogether more adviseable to settle in the country: the first place to which he went, in the capacity of a physician, was Nottingham, where he was entirely disappointed in his hopes of practice; he removed, therefore, to Litchfield, with letters of introduction to Lady Gresley and the Rev. Mr. Seward. Here his great capacity and various acquirements were more justly appreciated: he resided at Litchfield during a great number of years, in the enjoyment of a very extensive reputation, and a very profitable practice, the foundation of which is said to have been laid by his success in restoring to health a gentleman of fortune in the neighbourhood, whose recovery was despaired of by a numerous circle of friends and acquaintance.

In the year 1757 Dr. Darwin married Miss Mary Howard, daughter of Charles Howard, Esq. by his wife Elizabeth Foley: she died in 1770. By this lady he had five children, two of whom died in their infancy: the eldest son, Charles, he educated to his own profession, but he died in the 20th year of his age, very soon after he had finished his course of studies at Edinburgh, where he gained considerable reputation, by endeavouring to furnish a criterion for distinguishing *pus* from *mucus*.* The second son, Erasmus, was an attorney, and practised at Derby: about three years since (in 1799) he walked into his garden, at dead of night, threw himself into the Derwent, and was drowned. Dr. Darwin's third son, Robert, is a physician, in very extensive practice, at Shrewsbury, and married the daughter of the late Mr. Wedgewood, of Etruria.

Soon after the decease of his wife, Dr. Darwin commenced his laborious work, the *Zoonomia*, which, however, he did not think proper to publish till about eight years since.

* Dr. Darwin edited this posthumous work of his son Charles, which was published in 1780, under the title of "Experiments, establishing a Criterion between mucilaginous and purulent Matter: and an Account of the retrogade Motions of the absorbent Vessels of Animal Bodies in some Diseases."

In 1778 he obtained a lease of a picturesque spot of ground, about a mile from Litchfield, where a cold bath was erected by Sir John Floyer, an eminent physician in the beginning of the last century: there is a grotto, surrounded by projecting rocks, from the edges of which trickles a perpetual shower of water. This place became his favourite retreat and amusement: here he formed a botanic-garden, and began his poem on the "Loves of the Plants," the scenery of which, "as adapted to love-scenes, and being thence a proper residence for the modern Goddess of Botany," is taken from these sequestered shades:—

> "And if with thee some hapless maid should stray,
> Disastrous Love companion of her way,
> Oh lead her timid steps to yonder glade,
> Whose arching cliffs depending alders shade;
> There as meek Evening wakes her temperate breeze,
> And moon beams glimmer through the trembling trees,
> The rills, that gurgle round, shall soothe her ear,
> The weeping rocks shall number tear for tear," &c. &c.
>
> *Canto* 1, *line* 25.

In the year 1780, Dr. Darwin was called to attend Colonel Sacheverel Pole, of Radbourne-hall, distant four miles from Derby, and a few months after the decease of the Colonel he married his relict, Mrs. Pole, with a jointure of 600l. per annum, to which 100l. was added, by establishing the validity of a promissory-note, which had been given to her by her former husband. The marriage of Dr. Darwin occasioned his immediate removal from Litchfield to Radbourne, where he resided till he could be accommodated with a house in Derby: in this last situation he remained till about three months before his death, when he removed to an old mansion, called Breadwall Priory, about three miles distant from Derby, which was a commodious and peaceable retirement for his old age. During the last few years, Dr. Darwin was much subject to inflammation in his breast and lungs: he had a very serious attack of this disease in the course of the last spring, from which, after repeated bleedings by himself and a surgeon, he with great difficulty recovered. On the 10th of April last (1802) he was attacked with a severe shivering fit, followed by a correspondent hot one, and accompanied with symptoms of inflammation in his lungs: his surgeon, Mr. Hadley, took from him, in the course of the day, twenty-five ounces of blood: the fever was removed, and in two or three days he became, to all appearance, quite well, and declared himself perfectly recovered. On Saturday, the 17th, he amused himself in his garden, with

all his children, who were come home from school, probably, on account of the Easter-holidays: in the evening, as he was walking with Mrs. Darwin and a lady of about his own age, the latter remarked, that he would have sufficient employment for ten years in bringing all his plans about the place to perfection. "You, Madam (he replied) have as good a prospect as any body I know, of your age, of living ten years—I have not."—Mrs. Darwin remarked his good looks, spirits, and strength: he said, "I always appear particularly well immediately before I become ill." He sat with his family in the evening, conversing with his usual cheerfulness, went to bed, rose at six on the following morning, and wrote some letters: he was seized with a cold shivering fit, which increased, and was attended with thirst: he then sat down by the kitchen-fire, and drank a considerable quantity of butter milk, but feeling himself much indisposed, he lay down on a sofa, when becoming more cold and torpid, he was raised up, and placed in an arm-chair, where, without pain, or any emotion, he expired, between eight and nine o'clock, in the 71st year of his age.

The death of Dr. Darwin is variously accounted for: it is supposed to have been caused by the cold fit of an inflammatory fever: Dr. Fox, of Derby, considers the disease which occasioned it to have been *angina pectoris*; but Dr. Garlike, of the same place, thinks this opinion not sufficiently well-founded.

Dr. Darwin has left a widow and six children by his last marriage: besides these, there are two natural daughters (Misses Parker) whom he has established at a school at Ashbourne, and for whose instruction and assistance he composed and published his Treatise on Female Education.

During the whole of his life Dr. Darwin was remarkable for great benevolence of disposition, and it was particularly conspicuous in the care he took even of the lowest animals. He had frequently expressed a strong desire, that the termination of his existence might be without pain, having always looked upon death as the less evil of the two. He was of a middle stature, in person gross and corpulent; his features were coarse, and his countenance heavy; if not wholly void of animation, it certainly was by no means expressive. In his gait and dress he was rather clumsy and slovenly, and frequently walked with his tongue hanging out of his mouth.

In the second vol. of *Zoonomia* (Class iv. 1, 2, 15. Art. *Podagra,)* Dr. Darwin relates, that about five-and-forty years ago he was first seized with a fit of the gout; in consequence of which he totally abstained from all fermented liquors, not

even tasting small-beer, or a drop of any kind of wine: but he ate plentifully of flesh-meat, and all kinds of vegetables and fruit, using, for his drink at meals, chiefly water alone, or cream and water, with tea and coffee between them as usual. By this abstinence from fermented liquors he kept quite free from the gout for fifteen or sixteen years, and from some other complaints to which he had been subject: he then indulged himself occasionally with a little wine and water, cyder and water, &c. but was speedily admonished into his former temperance, by a paroxysm of the gout. He was in the habit of eating a large quantity of food, and his stomach possessed a strong power of digestion: his advice frequently was, "Eat, eat, eat, as much as you can;" but he took every opportunity to impress a dread of all fermented liquors on the minds of his patients, whose diseases he was too ready to represent as originating in the frequent use of them.

In the "Botanic Garden," (Part II. Canto iv. 357, &c.) Dr. Darwin has taken an opportunity to express his strong antipathy against fermented liquors, by comparing their effects to that of the Promethean fire: "The ancient story of Prometheus, who concealed in his bosom the fire he had stolen, and afterwards had a vulture perpetually gnawing his liver, affords so apt an allegory for the effects of drinking spirituous liquors, that one should be induced to think the art of distillation, as well as some other chemical processes (such as calcining gold), had been known in times of great antiquity, and lost again. The swallowing drams cannot be better represented in hieroglyphic language than by taking fire into one's bosom; and certain it is, that the general effect of drinking fermented or spirituous liquors is an inflamed, schirrous, or paralytic liver, with its various critical or consequential diseases, as leprous eruptions on the face, gout, dropsy, epilepsy, insanity."

The pretensions of Dr. Darwin to high rank as a MEDICAL PHILOSOPHER will, of course, bottom themselves in the merits, numerous and solid as they are, of the great work which he gave to the world in the year 1794. In whichever point of view the ZOONOMIA shall be considered, whether as a mere repository of curious natural and medical facts, or as a scheme and system of pathological and physiological disquisition, is probably matter of trifling import, so far as the reputation of its author is concerned. By either mode of appreciation it is unquestionably a noble effort of human labour or of human wit.

In a work, indeed, so varied, so complicated, so extensive,

it is an easy task, and requiring no extraordinary powers of perception, to discover many lapses in the design and execution: but when we call to mind the vastness of the whole fabric, the bold originality of the plan upon which it is constructed, the curious nature and beautiful arrangement of the materials which compose it, the elegance of all its ornamental, and the solidity of very many of its useful parts, we cannot hesitate to assign to its contriver the merit of uncommon taste, uncommon perseverance, and uncommon skill.

To justify the panegyric which we have now ventured to pronounce, it may seem reasonable to expect that we should present to our readers an analysis of the system invented by Dr. Darwin, in order "to reduce the facts belonging to ANIMAL LIFE into classes, orders, genera, and species; and, by comparing them with each other, to unravel the theory of diseases." Such, however, is the extent of, and so diversified are the topics embraced by his plan, that barely to enumerate the respective titles of the several sections into which it is broken, would be greatly to exceed the comparatively scanty limits within which, by the nature of our arrangement, we are of necessity confined. To the work itself we must and do appeal for our justification, confident, that although its illustrious author may have sometimes erred from excess of ingenuity,* that however he may have been occasionally blinded by too great a love of system, the ZOONOMIA will ever be considered as a production of transcendent merit.

> The work is done! Nor Folly's active rage,
> Nor Envy's self, shall blot the golden page;
> Time shall admire—his mellowing touch employ,
> And mend the immortal tablet, not destroy.

Next to Medicine, Mechanics, and almost every branch of Natural History, engaged his attention. He not only pursued these studies with great ardor and diligence himself, but also embraced every opportunity of cultivating and encouraging them amongst his numerous connections and acquaintance. Very soon after he settled in Derby, he instituted and established a philosophical society and library, both of which were in a flourishing condition at the time of his decease. The society, of which he was president, consists of members who reside in different parts of Nottinghamshire, Derbyshire, and Leicestershire. He also took pleasure in encouraging works in natural history. [*Lond. Mon. Mag.*

* It is with mingled emotions of pride and pleasure that we observe one of the most important and much-questioned of our great philosopher's theories established by Mr. Home's recent discovery and demonstration of the mobility of the nervous fibre.

INDEX

TO

VOL. VI.

INDEX.

INDEX.

INDEX.

INDEX.

INDEX.

INDEX.

INDEX.

END OF THE SIXTH VOLUME.